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| **Course Code** | **14EN2007/17LN2001** | **Duration** | **3hrs** |
| **Course Name** | **FRENCH I** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Vous avez \_\_\_\_\_\_\_\_\_carte d’identité  (vos / votre / mon) | CO 1 | R | 1 |
|  | b. | C’est \_\_\_\_\_\_\_\_\_ami ( un /une /des) | CO 1 | R | 1 |
|  |  | \_\_\_\_\_\_\_soir, je vais au temple. (cette / ce /ces) | CO 1 | R | 2 |
|  |  | Écrivez les mots “ chien , chat“ en anglais | CO 1 | R | 2 |
|  |  | Ecrivez les saisons  Ecrivez les jours de la semaine | CO 1 | U | 14 |
|  |  | **(OR)** |  |  |  |
| 1. | a. | Comment tu t’appelles ? | CO1 | R | 1 |
|  | b. | Quel animal aimes – tu ? | CO1 | R | 1 |
|  | c. | Ecrivez en anglais – le cadeau, un garçon | CO1 | R | 2 |
|  | d. | Quelle couleur aimes -tu ? | CO1 | R | 12 |
|  | e. | i)Marc et Julie  Marc est français. Il est gentil et intelligent. Il est un ami de Julie. Julie est américaine. Elle est très intelligente et sympa aussi. Ils sont amis.  À l’école de Marc, il y a beaucoup de filles et de garçons français. Ils sont élèves. L’école de Marc est très grande.  À l’école de Julie, il y a des filles et des garçons aussi. Il y a des élèves américains. L’école de Julie est petite. Le père de Marc s’appelle Raoul Dupont. Les parents de Julie s’appellent Franklin.  **Indicate whether each statement is true or false. Correct the false statements. (vrai ou faux)**  1. Marc Dupont est français.  2. Marc et Julie sont amis.  3. À l’école de Marc, il y a des garçons et des filles américains.  4. L’école de Julie est très grande.  **Complete each sentence with an appropriate word.**  1. Marc n’est pas américain. Il est ...........  2. L’école de Marc n’est pas petite. Elle est ............  3. Les parents de Juli s’appellent \_\_\_\_\_\_\_\_  **Ecrivez deux adjectifs** | CO3 | U | 14 |
|  |  | (OR) |  |  |  |
| 3. | a. | La fête nationale est \_\_\_\_\_\_\_ (2 mars / 14 Juillet / 4Juin) | CO 2 | R | 1 |
|  | b. | Liste les Monument français ? | CO 2 | R | 1 |
|  | c. | Écrivez en anglais : le pantalon, la jupe, | CO 2 | R | 2 |
|  | d. | Choisissez le verbe  1.Fabienne est français. Elle (vient / habite) à Paris  2. Isabelle \_\_\_\_\_\_\_(a /est) 27 ans. | CO 2 | R | 2 |
|  | e. | Conjuguez les verbes au présent : 1. Être  2 . Avoir | CO 2 | U | 14 |
|  |  | (OR) |  |  |  |
| 4. | a. | La tour Eiffel a été construite en 1889. A) Vrai b) faux | CO 2 | R | 1 |
|  | b. | C’est le Rois Soleil  a) Nepean Bonaparte b)Charles de Gaulle c)Louis XIV | CO 2 | R | 1 |
|  | c. | Ecrivez en anglais : sourire , triste , | CO 2 | R | 2 |
|  | d. | Nommez deux fruits | CO 2 | R | 2 |
|  | e. | i**)Ecrivez les mois de l’année**  **II)Reliez**  1.Ou vas-tu? - Je viens de l’inde  2. D’ou viens-tu? - Je vais à paris  3. Ou sont - elles? - Je vais bien  4. Ou se trouve le restaurant ?- Elles sont dans la chambre  5. comment vas-tu ? - J ‘ai dix-huit ans  6. Quel âge as-tu - Je suis indien  7. quelle est ta nationalité - Le restaurant est en face du musée | CO 2 | U | 14 |
|  |  | (OR) |  |  |  |
| 5. | a. | Écrivez le mot “ small “ en français | CO 3 | R | 1 |
|  | b. | Écrivez le mot “ petit déjeuner “ en anglais | CO 3 | R | 1 |
|  | c. | Quelle est ta nationalité ? | CO 3 | R | 2 |
|  | d. | Nommez deux fromages | CO 3 | R | 2 |
|  | e. | Présentez-vous | CO 4 | U | 14 |
|  |  | **(OR)** |  |  |  |
|  |  |  |  |  |  |
| 6. | a. | Est ce que tu es végétarien ? | CO 3 | R | 1 |
|  | b. | Nommez deux corps (parts of the body) | CO 3 | R | 1 |
|  | c. | Nommez deux montagnes ? | CO 3 | R | 2 |
|  | d. | Quels sont les repas français ? | CO 3 | R | 2 |
|  | e. | Traduisez en anglais  A : Bonjour, Je suis Barbara. Je travaille pour Pixma a Varsovie  B : Moi, c’est Blandine ; Je suis française je travaille a Mexico.  A :As tu habite a Mexico ?  B : Oui, J ‘habite a Mexico  A : Je viens de Madrid  B : Quelle est ta nationalité ? Libanaise ou française.  A : Je suis libanaise.  B : Quel âge as- tu ?  A : J’ai treize ans  A : Au revoir  B : A bien tôt | CO 3 | U | 14 |
|  |  | (OU) |  |  |  |
| 7. | a. | La tour Eiffel a été construite par \_\_\_\_\_\_\_  Gustave Eiffel /Napoléon Bonaparte | CO 4 | R | 1 |
|  | b. | Aimez -vous le cinema ? | CO 4 | R | 1 |
|  | c. | Ecrivez en anglais  Parler , aimer | CO 4 | R | 2 |
|  | d. | Nommez deux vins | CO 4 | R | 2 |
|  | e. | **Lisez le passage et répondez :**  Bonjour! Je m’appelle Caroline. J’ai deux amis. Ils s’appellent Mary et Paul. Mary habite à Lyon. Elle est française. Elle a douze ans. Elle a une grande famille. Elle aime la glace. Paul a treize ans. Il est anglais. Il parle anglais et espagnol. Il aime les chocolats.  **A. Répondez:**  1. Quel âge a Paul ?  2. Où habite Mary?  **B. Dites vrai ou faux:**  1.Mary est allemande  2. Paul aime la glace.  3. Paul est anglais.  4. Mary a une petite famille.  **C. Complétez avec un mot de texte:**  1. Il a \_\_\_\_\_\_\_ ans.  2. Je parle \_\_\_\_\_\_\_\_\_\_  3. Elle a une \_\_\_\_\_\_\_\_ maison.  4. Il \_\_\_\_\_\_\_\_ à Paris. | CO 4 | U | 14 |
|  |  |  |  |  |  |
| 8. | a. | Nommez deux légumes | CO 4 | R | 1 |
|  | b. | As – tu des frères ? | CO 4 | R | 1 |
|  | c. | Ton père , il s’ appelle comment ? | CO 4 | R | 2 |
|  | d. | Le frère de ta mère est ton o......... e | CO 4 | R | 2 |
|  | e. | Écrivez le négative : (utilisez ne .......... pas )  1.Nous prenons les livres.  2.Elle entre dans la cathédrale.  3.Ils rentrent à Rome.  4.Je viens du stade.  5. Je parle français.  6.Louise tombe sur le trottoir  7.Il parle français  8. Vous avez 33 ans.  9.Elles vont aux Etas unis  10.le père de Caroline travaille dans une banque.  11. Ils voyagent beaucoup.  12. Je finis mon travail.  13. Il est directeur.  14. Vous montez les valises | CO 4 | U | 14 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | \_\_\_\_\_\_est capitale de la France | CO 1 | R | 1 |
|  | b. | La France s’appelle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  a. L’hexagone b. L’octogone c. le pentagone | CO 1 | R | 1 |
|  |  | Nommez trois légumes | CO 1 | R | 3 |
|  |  | **Ecrivez les adjectifs possessifs**  1.\_\_\_\_\_\_\_\_\_\_\_amis sont sympas(leur / leurs /mes)  2. Nicolas, \_\_\_\_\_ sœur est très intelligente. (sa/son/ses)  3. Sarah, cherche \_\_\_\_\_ frère.(ton/son/sa)  4. Où sont \_\_\_\_\_ livres? (tes/ton /ta)  5. J'ai perdu \_\_\_\_\_ clés. (mon /ma/mes) | CO 5 | R | 5 |
|  |  | **Ecrivez les pronoms sujets (je , elle, il, nous, vous, ils)**  1……… sommes indiens  2. ……… êtes petit  3. ………parles anglaise  4…………est grand  5…………ai un chat  **Conjuguez les verbes.**  1. Je \_\_\_\_\_\_\_\_\_\_\_\_\_\_(finir)mon travail  2. Tu \_\_\_\_\_\_\_\_\_\_\_\_\_\_(parler)le français ?  3. Nous \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(voyager) en France  4. Elles \_\_\_\_\_\_\_\_\_\_\_(être) intelligentes  5. Nous \_\_\_\_\_\_\_\_\_\_\_\_\_(commencer) le cours du yoga | CO 6 | U | 10 |
|  |  |  |  |  |  |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Become familiar with the basics of the language |
| CO2 | Acquire a basic knowledge of French culture and its nuances |
| CO3 | Use familiar everyday expressions and phrases aimed at the satisfaction of needs of a concrete type |
| CO4 | Introduce himself/herself and others and can ask and answer questions about personal details |
| CO5 | Interact in a simple way provided the other person talks slowly and clearly and is prepared to help. |
| CO6 | Learn the various strategies to overcome the basic difficulties in LSRW |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 14 | - | - | - | - | 24 |
| CO2 | 6 | 14 | - | - |  |  | 20 |
| CO3 | 6 | 14 | - | - | - | - | 20 |
| CO4 | 6 | 14 | - | - |  |  | 20 |
| CO5 | 2 | - | - | - | - | - | 2 |
| CO6 | - | 14 | - | - | - | - | 14 |
|  | | | | | | | **100** |



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| **Course Code** | **14EN2010 / 17LN2002** | **Duration** | **3hrs** |
| **Course Name** | **FRENCH LANGUAGE II** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | La famille part Pour \_\_\_\_\_\_\_\_\_(Lyon/ Rouen / Nice) | COI | R | 1 |
|  | b. | Ces temples sont \_\_\_\_\_\_\_(grand) (adjectifs) | COI | R | 1 |
|  | c. | Nommez des fruits? | COI | R | 2 |
|  | d. | Ecrivez deux le mois de l’année. | COI | U | 14 |
|  | e. | Conjuguez les verbes au présent : 1. Faire , 2 . Avoir 3.Etre 4. aller | CO2 | R | 2 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Trouvez la verbe “ faites “ | CO2 | R | 1 |
|  | b. | Un repas familial : (a) goûter (b) déjeuner (c) dîner | CO2 | U | 1 |
|  | c. | Nommez des transports? | CO2 | R | 2 |
|  | d. | Ecrivez les noms des légumes. | CO2 | R | 2 |
|  | e. | **Remettez les phrases dans le bon ordre:**   * Oui, donnez-moi aussi deux kilos de pommes de terre. * Voilà l’argent. * Que desirez-vous monsieur? * Vous voulez autre chose? * Merci monsieur. * Combien ça fait? * Je veux un kilo de tomates et deux kilos d’oignons. * Ça fait 20€15. * Voilà monsieur. | CO2 | R | 14 |
|  |  |  |  |  |  |
| 3. | a. | La camembert est \_\_\_\_\_\_\_\_\_\_\_\_\_ (le fromage / le vin) | CO1 | R | 1 |
|  | b. | Ecrivez le mot “ content ‘ | COI | R | 1 |
|  | c.. | Est ce qu’on dit « bonjour » ou «  bonsoir » le matin ? | COI | R | 2 |
|  | d. | Nommez quelques professions des Français ? | COI | R | 2 |
|  | e. | Traduisez en anglais :  Je m'appelle Éric Garnier. , J'habite dans une ferme, près de Toulouse. J'aime beaucoup les animaux, mais à la maison, il y a des animaux extraordinaires ... Par exemple, il y a Télé. C'est le petit chien noir de mon frère, Marc. Il s' appelle Télé parce qu 'il adore la Télévision. Et Il y a aussi Blanco, le petit chat de Maman. Naturellement, il s'appelle Blanco parce qu 'il est blanc. Il déteste la télévision, mais il aime beaucoup la radio et il adore la musique.  Eh bien; Télé aime la télévision, mais Blanco préfère la radio ... voilà, c'est très bien... mais non! Ce n'est pas très bien parce qu'il y a aussi Jules et quelquefois, il y a Néron. Jules est le perroquet de ma Soeur, Claire. Il est petit et très mignon, mais il n' aime pas la télévision, il n’ aime pas la radio et il déteste la musique. | COI | U | 14 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Ta Méré, Il s’ appelle Comment ? | CO3 | R | 1 |
|  | b. | Eric habite a \_\_\_\_\_\_\_\_\_\_ | CO3 | R | 1 |
|  | c. | Écrivez le verbe “ être “ au futur ( forme vous ) | CO3 | R | 2 |
|  | d | As - tu des soeurs? | CO3 | R | 2 |
|  | e. | **Lisez le passage of répondez aux questions suivantes**  L’année dernière,, j’ai visite Paris pour la première fois. Avant mon arrivée. J’ai retenu une chambre a un lit a l’hôtel du Palais Royal.  J’ai visite de belles Cathradale.. J’ai vu la tour Eiffel et les autres monuments. J’ai pris mes repas dans les restaurants français. La France est très célèbre pour ses vins et ses fromages. J’ai acheté beaucoup de sortes de fromages pour ma famille et une bouteille de jus frais pour  Mon père. Les gens parisiens sont très aimables et sympathiques. C’est une belle ville pleine de charme.  **1.Repondez aux questions suivantes.**  1. Pourquoi la France, est-elle célèbre ?  2.Decrivez Paris par une phrase complète  **Dites vrai ou faux**  1. Les gens parisiens sont antipathiques.  2. La France est célèbre pour ses fromages.  3. Paris est une ville morte.  **Trouvez dans le texte**.  1. Un autre mot pour « fameux » \_\_\_\_\_\_\_\_\_\_\_\_\_\_  2. Le contraire de « laide » \_\_\_\_\_\_\_\_\_ avant \_\_\_\_\_\_\_\_\_\_  Départ \_\_\_\_\_\_\_\_\_\_\_  3. Un mot pour « une pièce ou l’on couche «  **Complétez avec un/des mots du texte.**  1. La semaine \_\_\_\_\_\_\_\_\_\_\_J’ai organisé une boum chez moi.  2.Combien de \_\_\_\_\_\_\_\_\_\_de desserts as-tu prépares ?  3.Nous avons nettoyé la maison \_\_\_\_\_\_\_\_\_\_le retour  de nos parents.  4.Donnez-moi une \_\_\_\_\_\_\_\_\_\_\_d’eau minérale. | CO3 | U | 14 |
|  |  |  |  |  |  |
| 5. | a. | Ecrivez le mot est ‘to know ‘ en français | CO4 | R | 1 |
|  | b. | Ecrivez Le mot est ‘ chambre’ en anglais | CO4 | R | 1 |
|  | c. | Ecrivez deux couleurs | CO4 | U | 2 |
|  | d. | Ecrivez deux mois de l’année | CO4 | U | 2 |
|  |  | **Écrivez les verbes au futur proche:**   1. Je ( finir ) Mon devoir 2. Nous ( arriver ) à l ‘ école 3. Ils ( faire ) le marché. 4. Je ( payer ) en liquid. 5. Je ( voir ) un serpent. 6. Elle ( vendre ) sa maison   7.Je ( donner ) un pourboire au garçon  8. Nous (telephoner) nos amis  9. Ils \_\_\_\_\_\_\_\_\_(manger) des repas  10. Tu \_\_\_\_\_\_\_\_(visiter) la temple.  **Traduisez en anglais:**  1.Des oeufs 2. Du sucre 3. Du beurre 4. De la confiture  5. Du sel 6. Huile 7. Pomme 8. L’oignons | CO4 | U | 14 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | \_\_\_\_\_\_\_\_\_prenons le vol Air France. (Vous /Nous /Je) | CO4 | R | 1 |
|  | b. | Les gens parisiens sont antipathiques. (vrai / faux) | CO4 | R | 1 |
|  | c. | Quel est ton numéro de téléphone ? | CO4 | U | 2 |
|  | d | Ecrivez les nombres (10 s to 50) | CO4 | U | 2 |
|  | e. | **2) Conjuguez les verbes au présent :**  1.Nous \_\_\_\_\_\_\_\_\_\_(diner) ensemble ce soir ? Tu \_\_\_\_\_\_\_\_(être) libre.  2. Nous \_\_\_\_\_\_(avoir) un nouveau professeur de français. Elle \_\_\_\_\_\_\_\_ (être) très sympa.  3. Vous \_\_\_\_\_\_\_(aimer) le tennis ?alors, Je\_\_\_\_\_\_\_\_\_\_(jouer)  4. Demain, on \_\_\_\_\_\_(aller) au château de Versailles.  Aussi nous \_\_\_\_\_\_\_\_\_\_\_(visiter) les monuments.  5. Et toi, en avril, on \_\_\_\_\_\_\_\_\_(déménager) à Grenoble.  **b) Écrivez au négatif :**  1.Elle est employée.  2. Tu parles anglais  3. Le technicien arrive le soir  4.Vous avez un stylo. | CO4 | U | 14 |
|  |  |  |  |  |  |
| 7. | a. | \_\_\_\_\_\_\_\_\_ symbolise la fière du peuple français. | CO3 | R | 1 |
|  | b. | M. Gustave Eiffel a construit \_\_\_\_\_\_\_\_\_\_\_ | CO3 | R | 1 |
|  | c. | Le Président reside au \_\_\_\_\_\_\_\_\_  (Champs Élysées / palais de l’Elysée) | CO3 | R | 2 |
|  | d. | Qui est le président de la France ? | CO3 | R | 2 |
|  | e. | **Traduisez en anglais**  A l’Hôtel  Réceptionniste : Bonjour monsieur !  Client : Bonjour Madame, J ;ai une réservation  Réceptionniste : Votre nom, s’il vous plait  Client : Je m’appelle David  Réceptionniste : Un moment, s’il vous plait. Voila M.David de Paris. Voici la clé magnétique de votre chambre…Chambre 515 votre carte d’identité, s’il vous plait ?  Client : Voici mon passeport.  Réceptionniste : Merci, monsieur. Bon séjour | CO3 | U | 14 |
|  |  | (OU) |  |  |  |
| 8 | a. | Il y a plus de \_\_\_\_\_\_\_\_\_\_sortes fromages.  300 / 400 | CO2 | R | 1 |
|  | b. | \_\_\_\_\_\_\_\_\_bicyclette est petite. (Ta /Ton /tes) | CO2 | U | 1 |
|  | C | Écrivez le mot en anglais.  Partir la plage | CO2 | R | 2 |
|  | d. | Lundi ,Mardi, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_ | CO2 | R | 2 |
|  | e | **I.Chassez l’intrus (odd one out)**   1. La chambre - le lit – la voiture – le poste de télé 2. La réceptionnistes - réserver -commander -la chambre 3. La réception - l’hôtel - le restaurant – la banque 4. Le carte de crédit – l’ordinateur – le billet de banque – le chèque 5. Le professeur – la réceptionniste -le serveur – le garçon   2**. Complétez avec (quel, quelle, quels, quelles)**  1.A \_\_\_\_\_nom vous avez une réservation ?  2. \_\_\_\_\_\_\_\_\_\_\_\_est le numéro de votre chambre ?  3. De \_\_\_\_\_\_\_\_pays est-ce que vous arrivez ?  4. \_\_\_\_\_\_\_\_\_\_couleur aimes -tu ? | CO2 | R | 14 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | La gomme est \_\_\_\_\_\_\_\_\_\_\_(petit /Petite) | CO1 | R | 1 |
|  | b. | Il y a \_\_\_\_\_\_\_\_\_station de métro ( un /une /des) | CO1 | R | 1 |
|  |  | Ecrivez les participé passe  Prendre , faire | CO2 | R | 2 |
|  |  | \_\_\_\_\_\_\_\_\_\_\_etait la premiere president  Charles Gaulle / Napoléon Bonaparte | CO5 | R | 2 |
|  |  | 2) **Reliez les colones**  1. bruit - to speak  2. Prendre - sorry  3. Parler - noise  4. Une femme - to take  5. noir - May  6. Desole - A Lady  7. Mai - pepper  8. Du poivre - black  9. L’avion - Ticket  10. Billet - Aeroplane | CO6 | U | 14 |
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**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Use familiar everyday expressions and very basic phrases aimed at the satisfaction of needs of a concrete type |
| CO2 | Understand the French culture and its nuances |
| CO3 | Interact in a simple way provided the other person talks slowly and clearly and is prepared to help. |
| CO4 | Learn the basic expressions of French and handle them confidently. |
| CO5 | Learn the various strategies to overcome the basic difficulties in LSRW |
| CO6 | Become familiar with the strategies of handling language contexts. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 14 |  |  |  |  | 24 |
| CO2 | 6 | 14 |  |  |  |  | 20 |
| CO3 | 6 | 14 |  |  |  |  | 20 |
| CO4 | 6 | 14 |  |  |  |  | 20 |
| CO5 | 2 | - |  |  |  |  | 2 |
| CO6 | - | 14 |  |  |  |  | 14 |
|  | | | | | | | **100** |



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| **Course Code** | **16CA2017/17CA2017** | **Duration** | **3hrs** |
| **Course Name** | **OBJECT ORIENTED ANALYSIS AND DESIGN** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss the drawbacks of the traditional programming approaches and justify why a paradigm shift towards object-oriented programming is more appropriate. | CO1 | U | 10 |
|  | b. | Simulate a real-world scenario where interfaces would be beneficial and explain how they would be implemented. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the key characteristics of classes, including attributes and methods, and how they contribute to object behavior. | CO1 | U | 10 |
|  | b. | Design a class *person* with 5 attributes and three instance methods. Create an object of the *person* class and call the instance methods. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Choose any project of your choice and narrate any ten functional requirements for your project. Identify the input, functionality, and outcome for each functional requirement. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Sketch level 0, level 1, and level 2 data flow diagrams for a library management system. | CO2 | A | 20 |
|  |  |  |  |  |  |
| 5. | a. | Design a set of five use case relationships for a banking system for different real-world scenarios. Analyze how different actors interact with the system, and describe the relationships between various use cases in each scenario. Depict the relationships using appropriate diagrams. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate the various approaches to identifying classes using appropriate examples and evaluate the effectiveness of each approach. | CO3 | E | 20 |
|  |  |  |  |  |  |
| 7. | a. | Classify the types of object relationships and illustrate each type with an example. | CO4 | An | 20 |
|  |  | **(OR)** |  |  |  |

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| 8. | a. | Design the relationships for the following class hierarchy and identify common functionalities and design interfaces.  Generalization  Define at least two interfaces for each class by featuring their functionalities in detail and sketch the relationship among the interfaces using a neat diagram. | CO4 | C | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Apply a three-tier approach design to a simple library management system with the following functions:  i. Adding a new book to the library catalog.  ii. Adding a new member to the library.  iii. Issuing a book to a library member.  iii. Managing member accounts, including fines for overdue books.  iv. Generating reports for the overdue books and calculating the total fine to be collected. | CO5 | C | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Show the importance of system analysis and design in software development. |
| CO2 | Understand Object Oriented Software Development Process. |
| CO3 | Gain exposure to Object Oriented Methodologies & UML Diagrams. |
| CO4 | Apply Object Oriented Analysis Processes for software projects. |
| CO5 | Construct various UML models. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 20 |  |  |  | 40 |
| CO2 |  |  | 40 |  |  |  | 40 |
| CO3 |  |  |  | 20 | 20 |  | 40 |
| CO4 |  |  |  | 20 |  | 20 | 40 |
| CO5 |  |  |  |  |  | 20 | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **16LN2010** | **Duration** | **3hrs** |
| **Course Name** | **HINDI – II** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | नीति वचन पद्य के कवी परिचय लिखिए | | CO1 | U | 10 |
|  | b. | वाणी पर संयम ,बात बिगड़ने न देना ,परोपकार समझावो | | CO1 | R | 10 |
|  |  |  |  |  |  |
| 2. | a. | मिलेश्वर जी का परिचय और उनकी किदाबें के बारे में लिखिए | | CO1 | U | 10 |
|  | b. | सचदेव ,उनकी पत्नी, याधू मिस्त्री के बारे में लिखिए | | CO1 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | योग्यता और व्यवसाय के लेखक के बारे में लिखिए | | CO2 | U | 10 |
|  | b. | इस पाठ के कहानी लिखिए | | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | द्विदेजी के बारे में और उनकी कृतियाँ लिखिए | | CO2 | U | 10 |
|  | b. | एक कुता और एक मैना कहानी क्या है ? | CO2 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | तुकडोजी का परिचय उनकी कृतियाँ विशेषता लिखिए | | CO3 | U | 10 |
|  | b. | कान की शोबा,जूट गवाही,उद्योगहीन आदमी समझाईये | | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | मैना के बारे में कहानीकार का मत क्या है ? | CO3 | U | 10 |
|  | b. | इस पाठ का सारांश लिखिए | | CO3 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | राज सरोवर ,हंसिनी का संवाद जनता के बारे में लिखिए | | CO4 | U | 10 |
|  | b. | हंसिनी की भविष्यवाणी सारांश लिखिए | | CO4 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | वृक्ष की हत्या लेखक और उनके किदाबे क्या कुआ है ? | CO4 | U | 10 |
|  | b. | इस कहानी का सारांश लिखिए | | CO4 | R | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | आवेदन पत्र – परीक्षा प्रवेश पत्र पाने के बारे में लिखिए | | CO5 |  | 10 |
|  | b. | खेल का मैदान बनाने के बारे में नगरपालिका को पत्र लिखिए | | CO6 |  | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | सामान्य हिंदी को समजने की क्षमता |
| CO2 | सामान्य पद्यों को उचित रूप से समजने की क्षमता |
| CO3 | हंबिंद को हल करने की क्षमता |
| CO4 | व्याकरण सहित बात करने की क्षमता |
| CO5 | अपनी राय प्रकट करने की क्षमता |
| CO6 | उपचारिक ,अनुपचारिक पत्रों फोरमों को बरने की क्षमता |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 20 | - | - | - | - | 40 |
| CO2 | 20 | 20 | - | - | - | - | 40 |
| CO3 | 20 | 20 | - | - | - | - | 40 |
| CO4 | 20 | 20 | - | - | - | - | 40 |
| CO5 | - | 10 | - | - | - | - | 10 |
| CO6 | 10 | - | - | - | - | - | 10 |
|  | | | | | | | **180** |



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| **Course Code** | **17LN2005** | **Duration** | **3hrs** |
| **Course Name** | **TAMIL - I** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | அ. | சத்திய ஞான தர்ம சபை பற்றிக் கூறுக. | CO2 | U | 5 |
|  | ஆ. | வெ. இறையன்புவின் கட்டுரையின் சாரத்தை விவரி. | CO2 | R | 10 |
|  | இ. | கிணற்றில் கிடைக்கும் பொருட்களாகக் கூறப்படுபவை எவை? | CO4 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | அ. | புத்தகங்கள் பற்றி பாரதிதாசன் குறிப்பிடுவதைக் கூறுக. | CO2 | R | 7 |
|  | ஆ. | தெய்வமணிமாலை பாடலின் பொருளை விளக்குக. | CO3 | R | 7 |
|  | இ. | புதுமைபித்தன் சிறுகதைக்கு கூறும் வரையறை யாது? | CO4 | An | 6 |
|  |  |  |  |  |  |
| 3. | அ. | சிறுகதைக்குரிய இலக்கணமாகக் கூறப்படுவதை விவரி. | CO5 | R | 7 |
|  | ஆ. | வள்ளலாரின் கொள்கைகளைக் கூறுக. | CO4 | R | 7 |
|  | இ. | சிறுகதை என்றால் என்ன ? விளக்குக. | CO6 | R | 6 |
|  |  | **(OR)** |  |  |  |
| 4. | அ. | தூர் கவிதையை விளக்கி அதில் வெளிப்படுத்தியுள்ள சமூகக் கருத்தைக் கூறுக. | CO3 | R | 10 |
|  | ஆ. | கண்ணன் என் விளையாட்டுப் பிள்ளை - கவிதை விளக்குக. | CO1 | R | 10 |
|  |  |  |  |  |  |
| 5. | அ. | பாரதிதாசன் படைப்புக்களைக் கூறுக. | CO4 | R | 3 |
|  | ஆ. | உடல் நலம் பேணல் பற்றி விவரி | CO1 | U | 7 |
|  | இ. | பாரத நாடு கவிதையை விவரி. | CO6 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | அ. | பாரதிதாசனின் தமிழ் வளர்ச்சிக் கவிதை பற்றி விளக்குக. | CO1 | U | 8 |
|  | ஆ. | சுதந்திர தாகம் கவிதையின் பொருளைக் கூறுக. | CO2 | U | 6 |
|  | இ. | குறிப்பு வரைக. 1. மாதவையர்  2. புதுமைப்பித்தன் | CO2 | R | 6 |
|  |  |  |  |  |  |
| 7. | அ. | குறிப்பு வரைக. 1. எஸ். ரா.  2. வ.வே.சு.ஐயர் | CO2 | U | 10 |
|  | ஆ. | சபையில் திரௌபதி நீதி கேட்டழுதல் பற்றி விவரி. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | அ. | நா. முத்துக்குமார் பற்றிய தகவல்களைத் தருக. | CO1 | R | 10 |
|  | ஆ. | கவிமணி - ஆசிரியர் குறிப்பு. | CO2 | R | 5 |
|  | இ. | திருவருட்பா குறிப்பு வரைக. | CO1 | U | 5 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | அ. | 1. பாரதியார் – பரமார்த்த குருவின் கதை 2. கல்கி – திருவருட்பா 3. நாமார்க்கும் குடியல்லோம்- பொன்னியின் செல்வன். 4. வள்ளலார் - கண்ணன் விளையாட்டுப் பிள்ளை 5. அழகியல் சிறுகதை - உத்தமர் தம் உறவு வேண்டும் 6. வீரமாமுனிவர் - கலையை ரசிக்கும் படி அமைவது 7. ஒருமையுடன் நின் திருமலரடி – வெ. இறையன்பு | CO3 | E | 7 |
|  | ஆ. | நா. முத்துக்குமார் பாடல்கள் இடம் பெற்ற படங்கள் மூன்றைக் குறிப்பிடுக. | CO2 | R | 3 |
|  | இ. | பாரதியார் ஆசிரியர் குறிப்பு வரைக. | CO2 | R | 5 |
|  | ஈ. | மனித சக்தியின் மகத்துவத்தை விவரி. | CO3 | U | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | மாணவர்கள் சமூக மாற்றச் சிந்தனைகளை அறிந்து கொள்வர். |
| CO2 | மாணவர்கள் கவிதை, சிறுகதை, புதினத்தைக் கற்பதன் மூலம் சமுதாயச் சிக்கல்களை உணர்ந்து அவற்றிற்குத் தீர்வு காண்பர். |
| CO3 | நாடகங்களை சமூகப் பயன்பாட்டிற்கு ஏற்ப உருவாக்கும் திறன் பெறுவர். |
| CO4 | தமிழ்க் காப்பியங்களில் அழகும் அறிவுணர்வும் ஊட்டும் பகுதிகளைப் படித்துப் புரிந்து கொள்வர். |
| CO5 | பண்டைய இலக்கிய பதிவுகளில் உள்ள பழந்தமிழரின் ஆளுமைகளையும் அடையாளங்களையும் அறிந்து கொள்வர். |
| CO6 | புதினம் வழித் தற்கால சிக்கல்களையும் அதற்கான தீர்வுகளையும் உருவாக்கும் திறன் பெறுவர் |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  |  |  |  |  |  |
| CO2 |  |  |  |  |  |  |  |
| CO3 |  |  |  |  |  |  |  |
| CO4 |  |  |  |  |  |  |  |
| CO5 |  |  |  |  |  |  |  |
| CO6 |  |  |  |  |  |  |  |
|  | | | | | | | **180** |



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| **Course Code** | **17LN2006** | **Duration** | **3hrs** |
| **Course Name** | **TAMIL - II** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | அ. | சிறுகதையின் தந்தை ----------- ஆவார். | CO6 | U | 1 |
|  | ஆ. | தமிழில் முதலில் வெளிவந்த சிறுகதைகளில் இரண்டைக் குறிப்பிடுக. | CO6 | R | 3 |
|  | இ. | சத்திய ஞான தர்ம சபை பற்றிக் கூறுக. | CO4 | U | 5 |
|  | ஈ. | தெய்வமணி மாலை இடம் பெற்றுள்ள திருமுறை யாது? இப்பாடல் யாரைப் பற்றிக் குறிப்பிடுக? | CO4 | R | 4 |
|  | உ. | பாரதியார் பற்றி குறிப்பு வரைக. | CO1 | R | 7 |
|  |  | **(OR)** |  |  |  |
| 2. | அ. | பாரதிதாசனின் இயற்பெயர் என்ன ? | CO1 | R | 2 |
|  | ஆ. | பசிப்பிணியைப் போக்க இராமலிங்க வள்ளலார் ------------------சபையை நிறுவினார் | CO4 | R | 1 |
|  | இ. | புதுமைபித்தன் சிறுகதைக்கு கூறும் வரையறை யாது? | CO6 | U | 5 |
|  | ஈ. | 1. வ.வே.சு 2. சுஜாதா 3. எஸ்.ரா. 4.புதுமைப்பித்தன் – குறிப்பு வரை. | CO3 | R | 12 |
|  |  |  |  |  |  |
| 3. | அ. | எஸ். ரா ----------- புதினத்திற்காக 2018-ல் சாகித்திய அகாதமி விருது பெற்றார். | CO1 | R | 1 |
|  | ஆ. | எதார்த்தக் சிறுகதை, வட்டார வழக்குச் சிறுகதை, சமூகச் சிறுகதை குறிப்பு எழுதுக. | CO6 | R | 9 |
|  | இ. | தெய்வமணிமாலை பாடலின் கருத்தைக் கூறுக. | CO4 | U | 7 |
|  | ஈ. | வள்ளலாரின் கொள்கைகள் மூன்றைக் கூறுக. | CO4 | R | 3 |
|  |  | (OR) |  |  |  |
| 4. | அ. | தூர் கவிதையில் கிணற்றில் கிடைக்கும் பொருட்களாகக் கூறப்படுபவை யாவை ?. | CO2 | R | 4 |
|  | ஆ. | **பாரதி பாரததேசத்தின் பெருமைகளாக கூறி இருப்பதை விவரி.** | CO2 | R | 7 |
|  | இ. | **திருமுறையின் ஆறு பிரிவுகளைக் கூறுக.** | CO4 | R | 4 |
|  | ஈ. | **சிறுகதையின் பிரிவுகள் ஐந்தைக் கூறுக.** | CO4 | U | 5 |
|  |  |  |  |  |  |
| 5. | அ. | சிறுகதையின் முன்னோடிகள் சிலரைக் குறிப்பிடுக. | CO6 | R | 5 |
|  | ஆ. | சிறுகதைப் பின்னலுக்கு உரிய மூன்று பகுதிகள் யாவை ? | CO6 | R | 2 |
|  | இ. | வாடிய ----------- கண்டபோதெல்லாம் ---------- என்பது வள்ளலாரின் கூற்றாகும். | CO4 | U | 1 |
|  | ஈ. | உடல் நலம் பேணல் பற்றி விவரி | CO2 | R | 7 |
|  | உ. | பாரதிதாசன் படைப்புக்களைக் கூறுக. | CO2 | R | 5 |
|  |  | (OR) |  |  |  |
| 6. | அ. | பாரதிதாசனின் தமிழ் வளர்ச்சிக் கவிதை பற்றி விளக்குக | CO1 | R | 7 |
|  | ஆ. | சிறுகதை எழுத்தாளர்கள் சிலரைக் குறிப்பிடுக | CO6 | R | 3 |
|  | இ. | பாரதியின் படைப்புகள் ஐந்தைக் கூறுக. | CO3 | R | 5 |
|  | ஈ. | சிறுகதை என்றால் என்ன? | CO5 | R | 5 |
|  |  |  |  |  |  |
| 7. | அ. | பாரதிதாசன் இயற்றிய இரண்டு நூல்களைக் கூறுக. | CO2 | U | 2 |
|  | ஆ. | வெ. இறையன்பு பற்றி ஆசிரியர் குறிப்பு வரைக. | CO6 | R | 5 |
|  | இ. | பாண்டவர்களி்ன் நிலையைக் கூறுக. | CO1 | R | 3 |
|  | ஈ. | கண்ணனின் குறும்புகளை விளக்குக. | CO1 | R | 10 |
|  |  | (OR) |  |  |  |
| 8. | அ. | வ. வே. சு. ஐயர் முதன் முதலில் எழுதிய சிறுகதை --------- | CO2 | R | 1 |
|  | ஆ. | மானிட சக்தி பற்றிய இரு கருத்துக்களை எழுதுக. | CO3 | U | 2 |
|  | இ. | வள்ளலார் - ஆசிரியர் குறிப்பு வரைக. | CO4 | R | 5 |
|  | ஈ. | **புத்தக சாலைக் கவிதையை விளக்குக** | CO5 | R | 7 |
|  | உ. | **கவிமணி - ஆசிரியர் குறிப்பு.** | CO1 | R | 5 |
|  |  |  |  |  |  |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | அ. | பொருத்துக.   1. நா. முத்துக்குமார் – மங்கையர்க்கரசியின் காதல் 2. பாரதிதாசன் – சஞ்சாரம் 3. கவிமணி – பொன்னியின் செல்வன் 4. வ. வே. சு.ஐயர் – ரங்கராஜன் 5. சுஜாதா – ஆதவன் 6. எஸ். ரா – பாண்டியன் பரிசு 7. கல்கி - தேரூர் | CO2 | R | 7 |
|  | ஆ. | நா. முத்துக்குமார் பற்றி குறிப்பு வரைக. | CO3 | R | 7 |
|  | இ. | பாரதியின் மனைவி பெயர் ------------------- | CO2 | R | 1 |
|  | ஈ. | **சிறுகதையின் இலக்கணத்தை எழுதுக.** | CO3 | U | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | மாணவர்கள் சமூக மாற்றச் சிந்தனைகளை அறிந்து கொள்வர். |
| CO2 | மாணவர்கள் கவிதை, சிறுகதை, புதினத்தைக் கற்பதன் மூலம் சமுதாயச் சிக்கல்களை உணர்ந்து அவற்றிற்குத் தீர்வு காண்பர். |
| CO3 | நாடகங்களை சமூகப் பயன்பாட்டிற்கு ஏற்ப உருவாக்கும் திறன் பெறுவர். |
| CO4 | தமிழ்க் காப்பியங்களில் அழகும் அறிவுணர்வும் ஊட்டும் பகுதிகளைப் படித்துப் புரிந்து கொள்வர். |
| CO5 | பண்டைய இலக்கிய பதிவுகளில் உள்ள பழந்தமிழரின் ஆளுமைகளையும் அடையாளங்களையும் அறிந்து கொள்வர். |
| CO6 | புதினம் வழித் தற்கால சிக்கல்களையும் அதற்கான தீர்வுகளையும் உருவாக்கும் திறன் பெறுவர் |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 35 |  |  |  |  |  | 35 |
| CO2 | 34 | 2 |  |  |  |  | 36 |
| CO3 | 24 | 7 |  |  |  |  | 31 |
| CO4 | 16 | 19 |  |  |  |  | 35 |
| CO5 | 12 |  |  |  |  |  | 12 |
| CO6 | 27 | 6 |  |  |  |  | 33 |
|  | | | | | | | **180** |



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| **Course Code** | **19CA3001** | **Duration** | **3hrs** |
| **Course Name** | **DATA MINING TECHNIQUES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe 3-tier architecture of Data Warehouse with a neat sketch. | CO1 | U | 10 |
|  | b. | Compare and contrast online transaction processing with online analytical processing. | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the association rules generated from frequent item sets. | CO3 | U | 10 |
|  | b. | Describe various OLAP operations performed on Multidimensional Data Model. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the measures of multidimensional data model. | CO2 | U | 10 |
|  | b. | Describe the process of data cleaning. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Write a brief note on relational databases. | CO2 | A | 10 |
|  | b. | Explain multilevel association rules. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Write the reason for naive Bayesian classification called “naive” and Briefly outline the major ideas of naive Bayesian classification. Explain Naive-Bayes classification. | CO4 | A | 10 |
|  | b. | Define and differentiate between outlier detection and elimination with two examples. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain about the basic Agglomerative Hierarchical clustering algorithm. | CO4 | U | 10 |
|  | b. | Write about Lazy Learners for classification. | CO5 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain Decision tree induction algorithm for classification and discuss the usage of information gain in this. | CO4 | U | 10 |
|  | b. | Discuss the similarity measures and distance measures frequently used in clustering the data. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Draw and explain the 4-dimensional data cube with an example. | CO6 | U | 10 |
|  | b. | Write short notes on DBSCAN and Outlier Analysis. | CO6 | A | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Calculate the frequent itemsets and strong association rules for the following transactional database table using Apriori algorithm. Consider the thresholds as support = 30% and confidence = 40%.  1 I1,i2,i3,i5  2 I2,i5,i7,i9  3 I1,i3,i5,i7  4 I2,i4,i6,i8  5 I1,i2,i3,i4  6 I2,i3,i4,i5  7 I3,i4,i5,i6  8 I4,i5,i6,i7  9 I5,i6,i7.i8.i9  10 I9.i1.i2.i5  11 I8,i2,i9,i7  12 I5,i6,i3,i2 | CO3 | A | 10 |
|  | b. | Describe backpropogation algorithm with example. | CO4 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall the concept of data mining and warehousing |
| CO2 | Learn data mining techniques for problem solving |
| CO3 | Identify the performance evaluation criteria of the model developed |
| CO4 | Build up data mining model for diverse applications |
| CO5 | Design and implement suitable algorithm for a given task |
| CO6 | Apply state of art development frame work and libraries for implementation |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  | 10 |  |  | 30 |
| CO2 |  | 20 | 10 |  |  |  | 30 |
| CO3 |  | 20 | 10 |  |  |  | 30 |
| CO4 |  | 30 | 10 |  |  |  | 40 |
| CO5 |  | 20 | 10 |  |  |  | 30 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
|  | | | | | | | **180** |



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| --- | --- | --- | --- |
| **Course Code** | **19CA3002** | **Duration** | **3hrs** |
| **Course Name** | **MACHINE LEARNING FOR IMAGE PROCESSING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain geometric, probabilistic and logical model in machine learning. | CO1 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the working of various rule models in machine learning. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Explain different forms of clustering algorithms. Explain the performance metrics used in clustering algorithm. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize various kinds of features and their transformation. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 5. | a. | Explain different color spaces in image processing. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Construct a program to do the following using Scikit Image   1. Generating pixel value. 2. Convert color spaces. 3. Creating basic drawings. 4. Perform gamma correction. | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. | a. | Construct a program using OpenCV to perform various operation   1. Changing the shape of images. 2. Effecting image thresholding. 3. Calculating gradients to detect edges. 4. Performing histogram equalization. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain how palm and face recognition is done in checking authenticity of a person. | CO5 | A | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the types of classification algorithms in machine learning. | CO6 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | Recall the concepts used in machine learning. |
| CO2 | Identify the problems that can be solved using machine learning techniques. |
| CO3 | Identify the appropriate algorithms for solving problems. |
| CO4 | Explore the fundamentals of images and their processing. |
| CO5 | Apply machine learning techniques for problem solving. |
| CO6 | Apply machine learning for processing images. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 40 | - | - | - | - | 40 |
| CO2 | - | - | 20 | - | - | - | 20 |
| CO3 | - | 20 | - | - | - | - | 20 |
| CO4 | - | 20 | 40 | - | - | - | 60 |
| CO5 | - | - | 20 | - | - | - | 20 |
| CO6 | - | - | 20 | - | - | - | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2004** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF INFORMATION TECHNOLOGY** | **Max. Marks** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **CO** | **BL** | **Marks** |
| 1. | a. | Explain in detail about the types of data. | CO1 | U | 20 |
|  | | **(OR)** | | | |
| 2. | a. | Write in detail about the Input units for the acquisition of numbers. | CO1 | R | 20 |
| 3. | a. | Explain the method of acquiring and storing the audio signals. | CO2 | U | 20 |
|  | | **(OR)** | | | |
| 4. | a. | Explain in detail about the secondary storage. | CO2 | U | 20 |
| 5. | a. | Illustrate the structure of central processing unit. | CO3 | A | 20 |
|  | | **(OR)** | | | |
| 6. | a. | Explain the LAN and its applications in detail. | CO3 | U | 20 |
|  |  |  |  |  |  |
| 7. | a. | Explain the concept of database management system with an example database design. | CO4 | U | 20 |
|  | | **(OR)** | | | |
| 8. | a. | Summarize the page description language in detail. | CO5 | U | 20 |
|  | | **Compulsory**: |  |  |  |
| 9. | a. | Explain the social uses of WWW in detail. | CO6 | U | 20 |

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|  | **COURSE OUTCOMES** |
|  |  |
| CO1 | Understand the different types of data. |
| CO2 | Understand data storage in computer. |
| CO3 | Develop knowledge about CPU, networks and output devices. |
| CO4 | Understand the database concepts. |
| CO5 | Acquire knowledge about data processing and the internet. |
| CO6 | Learn about applying IT techniques for societal impact. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 20 | 20 |  |  |  |  | 40 |
| CO2 |  | 40 |  |  |  |  | 40 |
| CO3 |  | 20 | 20 |  |  |  | 40 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 |  | 20 |  |  |  |  | 20 |
| CO6 |  | 20 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| --- | --- | --- | --- |
| **Course Code** | **20CA2006** | **Duration** | **3hrs** |
| **Course Name** | **FOUNDATION OF DATA SCIENCE AND ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the four levels of data with example. | CO1 | U | 12 |
|  | b. | Compare structured and unstructured data. | CO1 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Sketch the data science venn diagram and its functionality. | CO2 | A | 10 |
|  | b. | Compare quantitative and qualitative data with example. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | List the five essential steps to perform data science and its advantages. | CO2 | R | 12 |
|  | b. | Explain the types of quantitative data. | CO2 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the data structures used in pandas library. | CO2 | U | 10 |
|  | b. | Illustrate the strategies used to handle missing values. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Identify effective and ineffective visualizations using four basic types of graphs. | CO4 | A | 12 |
|  | b. | Explain Simpson’s paradox principle. | CO4 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | The grouped data in the following table represent the number of children from birth through the end of the teenage years in a large apartment complex. Calculate the mean, variance, and standard deviation.   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | Class | 0-3 | 4-7 | 8-11 | 12-15 | 16-19 | | Frequency | 7 | 4 | 19 | 12 | 8 | | CO3 | A | 10 |
|  | b. | List the steps used to combat the overfitting problem to fit machine learning models. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | The marks of 9 students on internal and end semester examinations in Data Analytics course are given below   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Internal | 82 | 73 | 95 | 66 | 84 | 89 | 51 | 82 | 75 | | End semester | 76 | 83 | 89 | 76 | 79 | 73 | 62 | 89 | 77 |   Calculate the simple linear regression analysis to predict the score on the end semester from the internal examination score. | CO6 | A | 12 |
|  | b. | Explain silhouette coefficient metrics. | CO4 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the three main metrics used in regression machine learning models. | CO5 | U | 15 |
|  | b. | Describe hypothesis test. | CO4 | R | 5 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Summarize naive baye’s classification with example. | CO5 | U | 10 |
|  | b. | Explain K-means clustering algorithm. | CO5 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | summarize the basics of data science. |
| CO2 | categorize data and process them. |
| CO3 | identify the mathematical foundations of data science. |
| CO4 | inspect the role of probability and statistics in data analytics. |
| CO5 | formulate the fundamentals of machine learning techniques in data exploration. |
| CO6 | apply data analytics to real world problems. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 30 | - | - | - | - | 30 |
| CO2 | 12 | 28 | 10 | - | - | - | 50 |
| CO3 | - | 10 | 10 | - | - | - | 20 |
| CO4 | 5 | 16 | 12 | - | - | - | 33 |
| CO5 | - | 35 | - | - | - | - | 35 |
| CO6 | - | - | 12 | - | - | - | 12 |
|  | | | | | | | **180** |



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| --- | --- | --- | --- |
| **Course Code** | **20CA2008** | **Duration** | **3hrs** |
| **Course Name** | **ESSENTIALS OF PYTHON PROGRAMMING** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the relational, logical, membership and identity operators. Construct a program to find the distance between two points. | CO1 | U | 10 |
|  | b. | Summarize the history of Python programming and its features. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Construct a program to perform various string handling functions   1. Length of the string. 2. String concatenation. 3. Slicing. 4. Count number of words in a string. 5. Case conversion. 6. String Comparison. | CO1 | A | 12 |
|  | b. | List the data types in Python programming. Construct a program to find the datatype of the input variable. | CO1 | R | 08 |
|  |  |  |  |  |  |
| 3. | a. | Summarize the various forms of control statements with examples. | CO2 | A | 14 |
|  | b. | Explain break, continue and pass statements with suitable examples. | CO2 | U | 06 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize the types of looping statements with examples. | CO2 | U | 12 |
|  | b. | Construct a program to print values from 1…10 using range () function. | CO2 | A | 08 |
|  |  |  |  |  |  |
| 5. | a. | Construct a program to perform basic arithmetic operations using functions. | CO3 | A | 10 |
|  | b. | Construct a program to calculate the factorial of a number using recursion. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Consider a scenario from a course in the student management system. Given below are 2 sets representing the names of students enrolled for a particular course.  PHP= {“John”, “Kumar”, “Susan”, “Kala”}  C#={“Raj”, “John”, “Nisha”, “Kala”}  Construct a python code to print the following   1. List the number of students enrolled for PHP course. 2. List the names of students enrolled for C# course only. 3. List the names of students enrolled for PHP course only. 4. List the number and names of students enrolled for both PHP and C# course. 5. List names and number of students enrolled for either PHP or C#. | CO4 | E | 10 |
|  | b. | Compare set with tuple. Summarize the advantage of using dictionary and list various operation in dictionary with suitable example. | CO4 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Create a Graphical User Interface for the following screen using tkinter. | CO6 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Construct a program to read and write the details of an employee in a file with the fields empname, empno, emppage, empsalary | CO6 | A | 10 |
|  | b. | Explain the advantages of using a file and write the modes used in the operation of a file. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Create a class named *Mobile*and create a method to get the inputs for *Manufacturer, Memory, Color, Year and price* and also a method to print the details of the mobile. | CO5 | C | 10 |
|  | b. | Explain constructor, single inheritance and multiple inheritance with suitable examples. | CO5 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics about python programming. |
| CO2 | Demonstrate the use of control flow statements in python. |
| CO3 | Develop modules for reusability of code. |
| CO4 | Infer the concept of collections in python. |
| CO5 | Illustrate object-oriented concepts. |
| CO6 | Make use of file handling concepts. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 8 | 20 | 12 | - | - | - | 40 |
| CO2 | - | 18 | 22 | - | - | - | 40 |
| CO3 | - | - | 20 | - | - | - | 20 |
| CO4 | - | - | - | 10 | 10 | - | 20 |
| CO5 | - | 10 | - | - | - | 10 | 20 |
| CO6 | - | 10 | 30 | - | - | - | 40 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2012** | **Duration** | **3hrs** |
| **Course Name** | **DATA STRUCTURES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A(4 X 20= 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the time and space complexity of an algorithm with example. | CO1 | U | 10 |
|  | b. | Explain the different approaches of an algorithm. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the array data structure. | CO2 | U | 10 |
|  | b. | Write the procedure to insert an element in the middle of the array. | CO2 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Write the algorithm for inserting a node before a given node in a linked list. | CO3 | A | 10 |
|  | b. | Compare singly linked list with circular linked list. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Listan algorithm to perform the following operations in a doubly linked list.  i.Insert a node at the end of the list.  ii.Delete the last node in the list. | CO3 | R | 10 |
|  | b. | Explain theany four applications of stack. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Write the procedure to insert an element in circular queue and delete an element from the circular queue. | CO4 | A | 10 |
|  | b. | Describe the operations of queue with examples. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the shell sort algorithm with example. | CO5 | U | 10 |
|  | b. | Distinguish between linear and binary search. State and explain the algorithm for both the search with example. | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Writean algorithm for preorder, inorder and postorder traversal of a binary tree. | CO6 | R | 10 |
|  | b. | Discussthe various methods in which a binary tree can be represented. List the advantage and disadvantage of each method. | CO6 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Distinguish between breadth first and depth first search with example. | CO6 | U | 10 |
|  | b. | Findout the in-degree and out-degree of each node in the given graph | CO6 | R | 10 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Write an algorithm for evaluation of postfix expression and evaluate the given postfix expression 9 3 4 \* 8 + 4/ -. | CO4 | A | 10 |
|  | b. | Write an algorithm for quick sort and sort the following elements using quick sort 5,6,1,10,8,2,14,12,7,3. | CO6 | A | 10 |

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|  | **COURSE OUTCOMES** |
| CO1 | Outline the different ways of arranging and handling collection of data. |
| CO2 | Organize data in arrays and perform operations. |
| CO3 | Organize and manipulate data using linked lists. |
| CO4 | Organize and manipulate data using stacks and queues. |
| CO5 | Understand searching and sorting techniques. |
| CO6 | Organize and manipulate data in trees and graphs. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | - | 20 | - | - | - | - | 20 |
| CO2 | - | 10 | 10 | - | - | - | 20 |
| CO3 | 10 | 10 | 10 | - | - | - | 30 |
| CO4 | - | 20 | 20 | - | - | - | 40 |
| CO5 | - | 20 | - | - | - | - | 20 |
| CO6 | 20 | 20 | 10 | - | - | - | 50 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2014** | **Duration** | **3hrs** |
| **Course Name** | **DATABASE MANAGEMENT SYSTEM** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the uses and applications of DBMS. | CO1 | R | 10 |
|  | b. | Classify various types of mapping cardinalities by considering Banking system database with all relationship set. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe different tiers of Database system architecture with example. | CO1 | R | 10 |
|  | b. | Compare generalization, specialization and Aggregation functions with example. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Consider the following relations for a company database Application.  Employee (Eno, Name, Sex, DOB, Doj, Designation, Basic\_Pay, Dept\_No) Department (DeptNo, Name)  Project (ProjNo, Name, Dept\_No) Works for (Eno, ProjNo, Date, Hours)  The business rules are stated as follows.  A department can control a project. An employee can work on any number of projects on a day. However an employee cannot work more than once on a project he/she worked on that day.   1. Identify the primary key and foreign key. 2. Draw the ER diagram for the above relations. | CO2 | E | 10 |
|  | b. | Explain the following Relational algebra operations for the given relation with suitable queries and syntax.  Employee (emp\_id, emp\_name, emp\_dept)  Department(dept\_no, dept\_name)   1. Cartesian product 2. Set difference | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the need for normalization and its types with suitable example. | CO3 | R | 20 |
|  |  |  |  |  |  |
| 5. | a. | Classify the types of functional dependencies with required example. | CO3 | U | 10 |
|  | b. | Explain the different Stages of transaction with neat sketch. | CO4 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain Two phase commit protocol for distributed transaction with neat diagram and example. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 7. | a. | Consider the following tables  Degree(degcode, name, subject)  Candidate(seatno, degcode, semester, month, year, result)  Marks(seatno, degcode, semester, month, year, papcode, marks)  Degcode-degree code, Name-name of the degree (MSc, MCOM)  Perform various query operations using TCL. | CO5 | E | 10 |
|  | b. | Discuss in detail about the types of Join operations with example queries. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Compare various transaction control operations such as Commit, rollback and save point with suitable queries for the given relation.  Student(Reg.No, Name, DOB, Degree, Grade) | CO5 | A | 10 |
|  | b. | Explain stored procedures with example queries. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the types of cursors with different attributes and example queries. | CO6 | U | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Evaluate business information problem and find the requirements of a problem in terms of data. |
| CO2 | Summarize about database schema and need for normalization. |
| CO3 | Design the database schema with the use of appropriate data types for storage of data in database. |
| CO4 | Use different types of physical implementation of database. |
| CO5 | Construct simple and moderately advanced database queries using Structured Query Language (SQL). |
| CO6 | Facilitate students to understand the concept of triggers. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 10 |  |  |  |  | 30 |
| CO2 |  | 10 | 10 |  | 10 |  | 30 |
| CO3 | 20 | 10 |  |  |  |  | 30 |
| CO4 | 10 | 20 |  |  |  |  | 30 |
| CO5 |  | 10 | 10 |  | 10 |  | 30 |
| CO6 |  | 30 |  |  |  |  | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2017** | **Duration** | **3hrs** |
| **Course Name** | **FUNDAMENTALS OF BUSINESS ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss the solutions provided by Business Intelligence. | CO1 | U | 10 |
|  | b. | Justify the need for transactional data in the decision-making process. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Illustrate how Business Intelligence can be used at different levels of effective decision-making. | CO1 | A | 20 |
|  |  |  |  |  |  |
| 3. | a. | Identify the different sources of structured data. | CO2 | R | 10 |
|  | b. | Bring out the difference between semi-structured data and unstructured data. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Compare the advantages of the Online Transaction Processing System and Online Analytical Processing System. | CO2 | An | 10 |
|  | b. | Infer the Online Analytical Processing system’s operation on Multi-dimensional Data. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the working of Business Intelligence with respect to E-Commerce Industry. | CO5 | A | 10 |
|  | b. | Differentiate between Casual and Power users in Business Intelligence. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Discuss the various stages in Extract Transform and Load with suitable examples. | CO3 | R | 20 |
|  |  |  |  |  |  |
| 7. | a. | Construct a logical data model for a supermarket store. | CO4 | A | 10 |
|  | b. | List and explain the main approaches to Data Integration. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss when and how to conduct Data Profiling. | CO3 | U | 10 |
|  | b. | Illustrate the conceptual data model for a software development company. | CO4 | A | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Identify the usage of Key Performance Indicators by Industries at different levels. | CO5 | R | 10 |
|  | b. | Discuss the role of a balanced scorecard in aligning the business activities of an organization. | CO6 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Construct an end-to-end data warehousing solution for business intelligence involving various data sources, ETL, multi-dimensional modeling, OLAP, reporting and analytics. |
| CO2 | Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence. |
| CO3 | Demonstrate the understanding of technology and processes associated with Business Intelligence framework. |
| CO4 | Apply the BI process across the organization and make predictive analytics. |
| CO5 | Identify the metrics, indicators and make recommendations to achieve the business goal for a given business scenario. |
| CO6 | Apply BI process into daily management activities with reporting. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 | 20 | - | - | - | 40 |
| CO2 | 10 | 10 | - | 20 | - | - | 40 |
| CO3 | 30 | 20 | - | - | - | - | 50 |
| CO4 | - | - | 20 | - | - | - | 20 |
| CO5 | 10 | - | 10 | - | - | - | 20 |
| CO6 | - | 10 | - | - | - | - | 10 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2018** | **Duration** | **3hrs** |
| **Course Name** | **BIG DATA ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the challenges faced in unstructured data and write the possible solution for the challenges. | CO1 | U | 10 |
|  | b. | Explain the Data Warehouse environment. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Express the importance of Big data. | CO1 | U | 10 |
|  | b. | Differentiate Big Data and Business Intelligence. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Discuss the handling of failures in Hadoop. | CO2 | U | 10 |
|  | b. | Explain various types of Hive file formats. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the different ways to insert data into table using Hive with example. | CO5 | U | 5 |
|  | b. | Describe MapReduce workflow in Hadoop along with wordcount example. | CO2 | A | 15 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the major blocks in HDFS architecture with example. | CO2 | U | 10 |
|  | b. | Write aggregate queries in mongoDB with example. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Write HiveQL queries to perform the following task with example   1. Create table 2. Divide a table into related parts(partions) 3. Create table using Bucketing | CO5 | A | 10 |
|  | b. | Explain YARN architecture with neat diagram. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain DDL and DML queries in Hive with example. | CO5 | U | 15 |
|  | b. | Express the reason behind need of NoSQL. | CO3 | U | 5 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the different types of pig queries. | CO5 | U | 10 |
|  | b. | Describe any two machine learning algorithm with example. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Write mongoDB queries for the following statements.   1. To create a collection by name “food” and then insert documents into the “food” collection. 2. Each document should have a fruits array with more than one fruit 3. To find those document from the food collection which has the fruits array of ‘banana’,’apple’, and ‘cherry’ 4. To find those documents from the food collection which has the fruits array having ‘banana’ as an element 5. To find the document with (\_id:1) from the food collection and display two elements from the array ‘fruits’ starting with the element at 1st index position. | CO4 | A | 10 |
|  | b. | Write HiveQL to perform the following statements   1. Create a database named “company” 2. Verify the database is created 3. Create a employee table with empid,name,salary,desgination etc. 4. Load data from file 5. Verify if the data is loaded 6. Display columns of a table | CO6 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Understand the fundamental of Big Data. |
| CO2 | Understand the concepts of Hadoop. |
| CO3 | Develop solutions to problems using Big Data. |
| CO4 | Acquire knowledge about MongoDB. |
| CO5 | Apply Big Data to solve real world problems. |
| CO6 | Illustrate the role of map reduce programming in various scenarios |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 30 |  |  |  |  | 30 |
| CO2 |  | 20 | 15 |  |  |  | 35 |
| CO3 |  | 25 |  |  |  |  | 25 |
| CO4 |  |  | 20 |  |  |  | 20 |
| CO5 |  | 40 | 10 |  |  |  | 50 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2021** | **Duration** | **3hrs** |
| **Course Name** | **DATA ANALYSIS AND VISUALIZATION** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Sketch the design flow of Tableau desktop and explain its data connection options. | CO1 | U | 15 |
|  | b. | Compare Tableau with traditional Business Intelligence. | CO1 | U | 05 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Summarize the steps used in data analysis process. | CO1 | U | 10 |
|  | b. | Explain the features of Tableau and history of data visualization. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Consider the manager of the company has set the following sales targets for the regional managers.   |  |  | | --- | --- | | **Region** | **Sales Target** | | East | 3500 | | South | 2500 | | West | 3000 | | North | 2000 |   Construct a bar chart to visually compare the region and the sales target. Explain Tree map, bullet chart and Combination chart. | CO2 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain extract and context filter in Tableau with case studies. | CO4 | U | 20 |
|  |  |  |  |  |  |
| 5. | a. | Construct a view that contains actions and parameter and summarize the advantage of using actions in Tableau. | CO3 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Summarize the various marks selection in a map and create a geographic map based on sales and location. | CO3 | U | 10 |
|  | b. | List and explain the types of calculated field in Tableau. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Create an URL action that allows to open a website directly inside the dashboard. | CO4 | A | 10 |
|  | b. | Create a web page using shiny that contain login form. | CO4 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Construct a calculated field for grouping the sales based on the categories poor, fair and good.   |  |  | | --- | --- | | **Sales** | **Category** | | >0 and <=5000 | Poor | | >5000 and <=10000 | Fair | | >10000 and <=50000 | Good |   State the advantages of using calculated field. | CO4 | A | 10 |
|  | b. | Explain parameters in Tableau with examples. | CO4 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Create a dashboard to display the various worksheets namely   1. Sales by category. 2. Profit by category. 3. Geospatial analysis. | CO5 | C | 10 |
|  | b. | Create a forecasting and timeline charts by predicting the future values of sales and profit. | CO6 | C | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Collect and process data, create an interactive visualization, and use it to demonstrate or provide insight into a problem, situation, or phenomenon. |
| CO2 | Employ best practices in data visualization to develop charts, maps, tables, and other visual representations of data. |
| CO3 | Summarize the basic knowledge needed to critique various visualizations (good and bad), and to identify design principles that make good visualizations effective using tableau. |
| CO4 | Illustrate the basic understanding of some of the challenges present in making data understandable across a wide range of potential audiences. |
| CO5 | Create, compelling, interactive dashboards to combine several visualizations into a cohesive and functional whole. |
| CO6 | Demonstrate their own skills in identifying a visualization that can be improved, completing their own design and/or analysis on the underlying data, and working to publish or promote acceptance of their presentation. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 40 | - | - | - | - | 40 |
| CO2 | - | - | 20 | - | - | - | 20 |
| CO3 | - | 10 | 20 | - | - | - | 30 |
| CO4 | - | 40 | 20 | - | - | 10 | 70 |
| CO5 | - | - | - | - | - | 10 | 10 |
| CO6 | - | - | - | - | - | 10 | 10 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2023** | **Duration** | **3hrs** |
| **Course Name** | **MACHINE LEARNING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss the k nearest neighbor learning and also explain the various application of the same. | CO1 | U | 15 |
|  | b. | Design a graph for classification and explain the same. | CO1 | C | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Implement handwritten recognition system and also discuss the machine learning key terminologies. | CO1 | A | 10 |
|  | b. | List any five NumPy functions with suitable example program. | CO1 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Design two arrays called a and b, subtract and add both arrays using numpy library. | CO1 | C | 5 |
|  | b. | Discuss the various datamining tasks. Classify the linear regression curve using the given data. Identify the outlier and circle the points.  x y  2 5  4 10  6 18  8 20  10 25 | CO4 | U | 15 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the various classification algorithm with suitable example. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 5. | a. | Compare the logistic regression and linear regression with suitable example. | CO3 | An | 10 |
|  | b. | Explain the support vector machines with suitable example. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Solve the below data and find the frequent item set using apriori algorithm.  Lightbox | CO5 | A | 15 |
|  | b. | Differentiate the logistic and linear graph with suitable example. | CO3 | C | 5 |
|  |  |  |  |  |  |
| 7. | a. | Solve the below data and find the frequent item set using Frequent Pattern Growth algorithm.   |  |  | | --- | --- | | TransactionId | Items | | 1 | {A,C,D} | | 2 | {B,C,D} | | 3 | {A,B,C,D} | | 4 | {B,D} | | 5 | {A,B,C,D} | | CO5 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe the linear regression and weighted linear regression with suitable example. | CO2 | An | 10 |
|  | b. | Compare the K-means and Bisecting K-means algorithm. | CO5 | An | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the dimensionality reduction techniques. | CO6 | U | 10 |
|  | b. | Implement the singular value decomposition in python and also discuss the various application of the same. | CO6 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Define the terminologies of Machine learning. |
| CO2 | Describe the concepts of Naïve Bayes theory and decision trees. |
| CO3 | Apply the algorithm of Support vector machines and Logistic regression in the real time problems. |
| CO4 | Analyze the regression models. |
| CO5 | Design unsupervised Learning algorithms using k-means clustering and Association analysis. |
| CO6 | Modify the data using principal component and singular value decomposition. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 15 | 10 |  |  | 10 | 45 |
| CO2 |  | 20 |  | 10 |  |  | 30 |
| CO3 |  | 10 |  | 10 |  | 5 | 25 |
| CO4 |  | 15 |  |  |  |  | 15 |
| CO5 |  |  | 35 | 10 |  |  | 45 |
| CO6 |  | 10 | 10 |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2027** | **Duration** | **3hrs** |
| **Course Name** | **PROFESSIONAL ETHICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the steps in confronting ethical dilemma in the organization with an example. | CO1 | R | 10 |
|  | b. | Discuss the methods of handling emotion in an intelligent way. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Justify with key points that professionals in weapon development is ethical or non-ethical. | CO1 | E | 10 |
|  | b. | Explain the uses of ethical theories in judgement with example. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Discuss different stages of moral development. | CO2 | U | 10 |
|  | b. | Describe the impacts of religion in ethics with example. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the roles, rights and responsibilities of a citizen. | CO3 | U | 10 |
|  | b. | Describe the professional responsibility of an engineer. | CO3 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss various rights of a professional. | CO3 | U | 10 |
|  | b. | Relate privacy and media. Do the social media follows privacy? Justify with examples. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain different types of intellectual property rights with examples. | CO4 | U | 10 |
|  | b. | Discuss the research ethics principles and guidelines. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe the significance of ethical codes in an organization. | CO5 | R | 10 |
|  | b. | Discuss the need for ethical audit in an organization with its guidelines. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the principles of ethical behavior of an auditor. | CO5 | U | 10 |
|  | b. | Discuss the significance of ethics in life and business. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss the role of human values in society. | CO6 | U | 10 |
|  | b. | Explain the importance of setting goals in life. | CO6 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the basics of ethics and values. |
| CO2 | Solve professional problems using ethical codes. |
| CO3 | Analyze ethical codes and audit. |
| CO4 | Organize the life supporting ethics. |
| CO5 | Apply attitudes in the various situations of personal life. |
| CO6 | Illustrate the importance of the ethical standards in day-to-day lives. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 |  |  | 10 |  | 30 |
| CO2 | 10 | 20 |  |  |  |  | 30 |
| CO3 | 10 | 20 |  |  |  |  | 30 |
| CO4 |  | 20 | 10 |  |  |  | 30 |
| CO5 | 10 | 20 |  |  |  |  | 30 |
| CO6 |  | 30 |  |  |  |  | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2029** | **Duration** | **3hrs** |
| **Course Name** | **ARTIFICIAL INTELLIGENCE FOR DATA SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Summarize the types of environment in AI. | CO1 | U | 14 |
|  | b. | Explain PEAS representation. | CO1 | U | 6 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Apply alpha-beta pruning to prune nodes in the following problem. | CO2 | A | 10 |
|  | b. | Summarize the properties of search algorithms. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Employ min-max algorithm for the following problem | CO2 | A | 10 |
|  | b. | Explain the working of artificial neural networks. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate the working of logistic regression algorithm. | CO3 | U | 10 |
|  | b. | Explain reinforcement learning and its types. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Differentiate explanation and logical formulation based learning. | CO4 | An | 10 |
|  | b. | Compare supervised and unsupervised learning. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Evaluate the working of informed and uninformed search techniques. | CO4 | E | 10 |
|  | b. | Explain the different techniques involved in image pre-processing. | CO6 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Summarize hardware components of robots. | CO6 | U | 10 |
|  | b. | Explain the characteristics and structure of AI agent. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Illustrate Greedy search with suitable example. | CO2 | U | 10 |
|  | b. | Evaluate the two types of finite automata. | CO5 | E | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Enumerate the steps involved in NLP. | CO5 | R | 10 |
|  | b. | Summarize the implementation aspects of syntactic analysis. | CO5 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | relate artificial intelligence to natural intelligence. |
| CO2 | summarize problem solving techniques in games. |
| CO3 | examine different forms of learning from nature. |
| CO4 | utilize logic-based reasoning and learning. |
| CO5 | discover the role of Artificial intelligence in natural languages. |
| CO6 | inspect the applications of Artificial Intelligence in Diverse Fields. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 30 |  |  |  |  | 30 |
| CO2 |  | 20 | 20 |  |  |  | 40 |
| CO3 |  | 30 |  |  |  |  | 30 |
| CO4 |  |  | 20 |  | 10 |  | 30 |
| CO5 | 10 | 10 |  |  | 10 |  | 30 |
| CO6 |  | 20 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2030** | **Duration** | **3hrs** |
| **Course Name** | **OPERATING SYSTEM SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Differentiate system software and application software with example. | CO1 | U | 10 |
|  | b. | Classify the services provided by operating system. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Describe the process that happens in each pass of an assembler with example. | CO1 | R | 10 |
|  | b. | Discuss in detail about the various memory hierarchies with neat block diagram. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain different types of Batch operating system and discuss the merits and demerits of each type. | CO2 | U | 10 |
|  | b. | Give examples for Operating system structures with neat sketch. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Compare FCFS and round robin CPU scheduling algorithms by calculating the average waiting time of process for the given data.   |  |  | | --- | --- | | Process id | Request time | | P1 | 5 | | P2 | 6 | | P3 | 4 | | P4 | 5 | | P5 | 3 | | Time quantum: 4ms | | | CO3 | An | 10 |
|  | b. | Discuss the types of SJN scheduling algorithm with example. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss various operations and different stages of process during execution. | CO3 | U | 10 |
|  | b. | Explain contiguous memory allocation types with block diagram. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Calculate seek time of disk scheduling algorithm such as SCAN and CSCAN for the given data  Order of request: ( 82, 172, 40, 52, 80,10,12,152)  Assume current position of read write head is at 40. | CO4 | An | 10 |
|  | b. | Describe in detail about file system implementation and file allocation methods. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Discuss in detail about various types of authentication methods. | CO5 | U | 10 |
|  | b. | Explain threats monitoring system to avoid program and system threats. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Compare various Computer security classifications in detail. | CO5 | U | 10 |
|  | b. | Discuss different types of kernel attacks with example. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Compare various types of memory corruption vulnerabilities in LINUX and Windows OS. | CO6 | E | 10 |
|  | b. | Explain the methods of attacking remote system through vulnerabilities. | CO6 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Describe the Operating System concepts. |
| CO2 | Explain the Operating Structure and Storage hierarchy. |
| CO3 | State process management. |
| CO4 | Show the capability in handling efficiently the Protection mechanism and the storage. |
| CO5 | Discuss the Operating System Security and Protection mechanism |
| CO6 | Outline the kernel exploit. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 |  |  |  |  | 30 |
| CO2 |  | 30 |  |  |  |  | 30 |
| CO3 |  | 20 |  | 10 |  |  | 30 |
| CO4 | 10 | 10 |  | 10 |  |  | 30 |
| CO5 |  | 30 |  |  |  |  | 30 |
| CO6 |  | 20 |  |  | 10 |  | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2031** | **Duration** | **3hrs** |
| **Course Name** | **CYBER CRIMES AND CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Analyze the challenges identified in modern day cybercrimes and discuss the strategies for mitigation. | CO1 | An | 10 |
|  | b. | Classify the cybercriminals and discuss how modern technologies enable a rise in the cybercrimes. | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the manifestations of cybercrimes aimed at property. | CO1 | U | 10 |
|  | b. | Illustrate any two case studies of cyberattacks and discuss the mitigation measures for preventing cyberattacks. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Infer the role of cryptocurrencies digital transactions and highlight the salient features of bitcoin transactions. | CO2 | An | 10 |
|  | b. | Analyze the process of securing Ethereum transactions using proof-of-stake and blockchain. | CO2 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Examine how dark web and deep web serve as a haven for cyber attackers. | CO2 | A | 10 |
|  | b. | Analyze the impact of malware attacks and discuss the methods to control user access. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate neo-traditional crimes with suitable examples. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the money laundering process and the traditional methods employed and discuss the solutions to prevent the same. | CO3 | U | 10 |
|  | b. | Describe the components of CIA triad and information security and discuss the key concepts to enforce CIA. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Simulate appropriate scenarios to highlight the significance and drawbacks of symmetric and asymmetric cryptography. Discuss the probable solutions to tackle the issues involved. | CO4 | A | 10 |
|  | b. | Classify the types of firewalls based on their design techniques. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Compare and contrast the various methods used to detect Click Fraud in Pay Per Click (PPC) advertising campaigns highlighting the strengths and weaknesses of these detection methods. | CO4 | An | 10 |
|  | b. | Explain how HTTP, DNS, and ICMP can be utilized as tunneling protocols providing examples of real-world scenarios where each of these protocols has been used to covert data transmission. | CO5 | A | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the strategies used in launching cross-site scripting and evaluate its harmful effects. | CO6 | An | 10 |
|  | b. | Evaluate the negative impacts of social engineering attacks with examples. | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
| --- | --- |
|  | **COURSE OUTCOMES** |
| CO1 | categorize the changes in society associated with the advent of technological changes and the introduction of the Internet. |
| CO2 | explain computer-related crime. |
| CO3 | develop a working knowledge of the classifications of motive for modern computer intruders and how they relate to each other in the digital security realm. |
| CO4 | discuss the basic concepts of cryptographic technology and the major mathematical principles used  by cryptographic systems. |
| CO5 | describe the risks posed by the various types of malicious code objects and develop adequate  countermeasures to protect the systems. |
| CO6 | access and mitigate vulnerabilities. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | 10 | 20 | - | - | 40 |
| CO2 | - | - | 10 | 30 | - | - | 40 |
| CO3 | - | 20 | - | 20 | - | - | 40 |
| CO4 | - | - | 10 | 10 | - | - | 20 |
| CO5 | - | - | 10 | 10 | - | - | 20 |
| CO6 | - | - | - | 10 | 10 | - | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2032** | **Duration** | **3hrs** |
| **Course Name** | **INFORMATION SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the basic security concepts in information security and list the types of vulnerabilities. | CO1 | R | 10 |
|  | b. | State the importance of authorization and identify the types of authorization. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Express the motivations of attacks and classify the four primary classes of attacks. | CO1 | U | 10 |
|  | b. | Categorize the components of threat and illustrate the types of threat agents. | CO1 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Classify the models of access control and illustrate its advantages and disadvantages. | CO2 | U | 10 |
|  | b. | Generalize access control and illustrate the essential steps and practices for access control monitoring. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | State the importance of access control and observe the best practices to ensure effective access control. | CO2 | R | 10 |
|  | b. | Define physical security and tabulate the difference between physical security and logical security in information security. | CO2 | R | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss protected health information and its identifiers, write the example of non-Protected health information. | CO3 | U | 10 |
|  | b. | Compare DES (Data Encryption Standard) and AES (Advanced Encryption Standard). | CO6 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Identify the importance of data security and enumerate the types of data security. | CO3 | R | 10 |
|  | b. | Describe the risk associated with cryptography using plaintext in communication. | CO6 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Define operational security and identify the goals of operational security. | CO5 | R | 10 |
|  | b. | Describe the patch management life cycle using operational security. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Classify the kinds of intrusion detection system in detail. | CO5 | U | 10 |
|  | b. | Explain the cryptographic algorithm of stream cipher with a diagram. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss the capability maturity model of software development security. | CO4 | U | 10 |
|  | b. | Explain the common models of software development life cycle and the benefits of implementing software development life cycle. | CO4 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | explain information security concepts and how they relate to one another helps security professionals design and implement secure systems. |
| CO2 | apply applying various concepts, methodology, techniques and provide user access to resources |
| CO3 | classify information based on its value to the organization. |
| CO4 | apply security in the software development life cycle and assess the effectiveness of software security. |
| CO5 | discuss about the ongoing, day-to-day management of security functions. |
| CO6 | explain the basic terminology of cryptography and apply various key algorithms. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 10 |  | 10 |  |  | 40 |
| CO2 | 20 | 20 |  |  |  |  | 40 |
| CO3 | 10 | 10 |  |  |  |  | 20 |
| CO4 |  | 10 | 10 |  |  |  | 20 |
| CO5 | 10 | 20 |  |  |  |  | 30 |
| CO6 |  | 20 |  |  | 10 |  | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2033** | **Duration** | **3hrs** |
| **Course Name** | **CYBER FORENSICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Define Forensic Science. List the fields in Forensic Science. | CO1 | R | 5 |
|  | b. | Categorize the various parts of hard disk, with neat diagram and explain its working. | CO1 | An | 15 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | With neat diagram, list and explain the various steps or phases in cyber forensics. | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Discuss various Operating System utilities such as Net Sessions, Open Files and Netstat with its various parameters. | CO2 | An | 10 |
|  | b. | List out various storage formats acquired for digital evidence during data acquisition. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Elaborate the four types of partitions. | CO3 | A | 10 |
|  | b. | Compare the advantages and disadvantages of various RAID levels. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the way by which windows password are saved, and how does it relate to forensics importance. | CO3 | R | 15 |
|  | b. | Relate the steganography terms Payload, carrier and Channel and list few tools that are available for implementing steganography. | CO5 | A | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate various forms of data hiding such as Disk cleaning utilities, File wiping utilities and Disk degaussing. | CO3 | E | 10 |
|  | b. | Illustrate the use of log files gathered from various digital devices. | CO4 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the TCP Header with suitable diagram. Also, distinguish between TCP and UDP. | CO4 | An | 15 |
|  | b. | Relate the advantages and disadvantages of wireless networks. | CO4 | A | 5 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss the crimes happening in online games. Write notes on electronic discovery. What is Big Data? | CO5 | R | 12 |
|  | b. | Relate the various types of investigation. | CO5 | A | 8 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | List few forensic tools used by experts to analyze data captured from memory. | CO6 | U | 5 |
|  | b. | Develop a way by which imaging can be done from original drive and prove its integrity. | CO6 | C | 15 |

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|  | **COURSE OUTCOMES** |
| CO1 | describe cyber forensics and the knowledge required to do the forensic analysis |
| CO2 | extend Scientific approaches to forensics that helps to identify, classify, locate and recover the evidence |
| CO3 | choose and apply current cyber forensics tools. |
| CO4 | devise basic network forensic analysis |
| CO5 | identify the emerging forensic technology |
| CO6 | show the required knowledge and expertise to become a proficient forensic investigator |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 5 | 20 |  | 15 |  |  | 40 |
| CO2 |  | 10 |  | 10 |  |  | 20 |
| CO3 | 15 | 10 | 10 |  | 10 |  | 45 |
| CO4 | 10 |  | 5 | 15 |  |  | 30 |
| CO5 | 12 |  | 13 |  |  |  | 25 |
| CO6 |  | 5 |  |  |  | 15 | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2035** | **Duration** | **3hrs** |
| **Course Name** | **COMPUTER NETWORKS AND NETWORK SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **Course Outcome** | **Bloom’s Level** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Summarize the working of the Internet and Transport layer protocols. | CO3 | U | 10 |
|  | b. | Analyze the working of stateful and cloud-based firewalls. | CO5 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the Ethernet frame format. | CO2 | U | 10 |
|  | b. | Summarize switch stacking using access-layer switches. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Enumerate the working of EIGRP. | CO2 | R | 10 |
|  | b. | Explain the different transmission types in networks. | CO1 | U | 6 |
|  | c.. | Differentiate IPv4 and IPv6. | CO1 | An | 4 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the different types of Ethernet cables. | CO1 | U | 10 |
|  | b. | Differentiate mesh and ring topology. | CO4 | An | 6 |
|  | c | Illustrate the three-way handshake in TCP. | CO4 | U | 4 |
|  |  |  |  |  |  |
| 5. | a. | Explain the working of WAN devices. | CO4 | U | 10 |
|  | b. | Differentiate IP and MAC addresses. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate the configuration of security in the switch port. | CO4 | U | 10 |
|  | b. | Evaluate 802.1x protocol and DHCP snooping in network security. | CO3 | C | 10 |
|  |  |  |  |  |  |
| 7. | a. | Compare the static and dynamic IP addressing. | CO5 | U | 10 |
|  | b. | Explain the different classes of IP addresses and the concept of subnetting. | CO6 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Illustrate the functions of the data-link, network, and transport layer. | CO1 | U | 12 |
|  | b. | Explain the application layer protocols in the TCP/IP model. | CO1 | U | 8 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Illustrate the working of IS-IS and OSPG. | CO6 | U | 10 |
|  | b. | Evaluate the types of IDPS used for network security. | CO5 | C | 10 |

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|  | **COURSE OUTCOMES** |
| CO1 | Describe OSI and TCP/IP models, compare and contrast network topologies and also select the appropriate cabling type based on implementation requirements. |
| CO2 | Explain various router components, remotely access routers, and test network connectivity. |
| CO3 | Demonstrate a detailed knowledge of the operation and configuration of switches. |
| CO4 | Configure and understand the components and operation of a wireless LAN (WLAN). |
| CO5 | Demonstrate expertise in configuring host and network level technical security controls. |
| CO6 | Identify core networking and infrastructure components and design an IT infrastructure including devices, topologies, protocols, systems software, management, and security. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 |  | 36 |  | 4 |  |  | 40 |
| CO2 | 10 | 10 |  |  |  |  | 20 |
| CO3 |  | 20 |  |  |  | 20 | 40 |
| CO4 |  | 20 |  | 10 |  |  | 30 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 | 10 | 10 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **DATABASE SECURITY** | **Duration** | **3hrs** |
| **Course Name** | **20CA2037** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the database architecture in detail. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Draw and explain an E-R diagram for paying the fees by a student. | CO1 | A | 10 |
|  | b. | Discuss the different hashing techniques. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the deadlock in detail. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Demonstrate two-phase locking protocol in detail. | CO3 | A | 10 |
|  | b. | Discuss the various transaction state with suitable diagram. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the overview of database security in detail. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | State the ER model and their usage in detail. | CO1 | R | 12 |
|  | b. | Discuss the fundamentals of information encryption. | CO4 | U | 8 |
|  |  |  |  |  |  |
| 7. | a. | Demonstrate various types of authentications in detail. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe about the security features which can be adopted for healthcare applications. | CO4 | U | 10 |
|  | b. | Explain about the applications of database auditing. | CO5 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss about the back up and recovery in detail. | CO6 | U | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Design and develop database. |
| CO2 | Write efficient and complex queries. |
| CO3 | Identify proper authentication and authorization techniques for Database applications. |
| CO4 | design multilevel security scheme for database. |
| CO5 | perform database auditing and database performance tuning. |
| CO6 | perform database backup and recovery. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 12 | 10 | 10 |  |  |  | 32 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 |  | 70 | 10 |  |  |  | 80 |
| CO4 |  | 18 |  |  |  |  | 18 |
| CO5 |  | 10 |  |  |  |  | 10 |
| CO6 |  | 20 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2039** | **Duration** | **3hrs** |
| **Course Name** | **BIOMETRIC SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Identify the essential components required for building a biometric system and explain the functionality of each component in detail. | CO1 | U | 10 |
|  | b. | Explain the identity management functionalities of a biometric system. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Identify any five commonly used biometric traits and discuss how they can play a better role in identification and verification systems. | CO1 | U | 10 |
|  | b. | Compare biometrics with traditional person recognition methods and discuss the pros and cons. | CO1 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Identify the distinctive characteristics of fingerprints. | CO2 | A | 10 |
|  | b. | Sketch the design and processing options of finger scan systems highlighting the differences in each option. | CO2 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the components and working of retina scan systems. | CO2 | U | 10 |
|  | b. | Analyze the strengths and weaknesses of iris scan systems. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Identify the components required for AFIS systems and demonstrate the working of AFIS systems. | CO3 | U | 10 |
|  | b. | Summarize the strengths and weaknesses of voice scan systems. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Identify notable deployments of AFIS systems. | CO3 | U | 10 |
|  | b. | Explain the components and working of keystroke scan systems. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the effectiveness of biometrics in PC/Network access applications. | CO4 | U | 10 |
|  | b. | Identify a suitable biometric feature for employee attendance applications and the components required for designing such a system. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain any two case studies in which biometrics are effectively used for citizen-facing applications. | CO4 | U | 10 |
|  | b. | Compare and contrast employee-facing applications with customer-facing applications. | CO5 | An | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the privacy concerns associated with biometric deployments. | CO6 | U | 10 |
|  | b. | Justify that DNA matching can be an effective mechanism for criminal identification using suitable case studies. | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Describe the principles of biometric systems. |
| CO2 | Recognize the various modules constituting a biometric system. |
| CO3 | Explain different types of biometric traits. |
| CO4 | Analyze basic biometric system applications. |
| CO5 | Identify the sociological and acceptance issues associated with the design and implementation of biometric systems. |
| CO6 | Infer the challenges and limitations associated with biometrics. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 30 |  | 10 |  |  | 40 |
| CO2 |  | 10 | 20 | 10 |  |  | 40 |
| CO3 |  | 40 |  |  |  |  | 40 |
| CO4 |  | 20 |  |  |  |  | 20 |
| CO5 |  |  | 10 | 10 |  |  | 20 |
| CO6 |  | 10 |  |  | 10 |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2040** | **Duration** | **3hrs** |
| **Course Name** | **GENERAL FORENSIC SCIENCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Interpret the various aspects of the criminal justice system. | CO3 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Examine the main functions of the forensic scientist. | CO2 | R | 10 |
|  | b. | Define any one development in the history of forensic science with a suitable illustration. | CO1 | R | 10 |
|  |  |  |  |  |  |
| 3. | a. | Discuss the usage of PPE in detail. | CO4 | U | 10 |
|  | b. | Visualize the different methods of searching a crime scene with a suitable explanation. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Devise a suitable sketching plan for documenting a crime scene. | CO2 | An | 10 |
|  | b. | Review the investigation of a crime scenario in India. | CO2 | C | 10 |
|  |  |  |  |  |  |
| 5. | a. | Evaluate the computer forensic analysis and the processing of an electronic crime scene. | CO6 | E | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Analyze the various kinds of digital evidence. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Illustrate the computer crime scene investigation and write about cybercrimes. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Write about forensic psychology and brain fingerprinting in detail. | CO5 | A | 10 |
|  | b. | Describe polygraph and narco-analysis techniques. | CO5 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Discuss the analysis of evidence using forensic toxicology and forensic medicine. | CO4 | U | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | explain the history of the forensic sciences |
| CO2 | define the roles of different types of professionals involved in evaluating a crime scene and collecting the evidence |
| CO3 | state the aspects of the justice system followed |
| CO4 | outline the methodology of collecting & interpreting data, avoiding contamination, and preservation of chain of custody |
| CO5 | state the importance pertaining to forensic examination |
| CO6 | show the evidence in a professional (courtroom) setting |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | - | - | - | - | - | 10 |
| CO2 | 20 | - | - | 10 | - | 10 | 40 |
| CO3 | - | 20 | - | - | - | - | 20 |
| CO4 | - | 30 | - | 20 | - | - | 50 |
| CO5 | - | 30 | 10 | - | - | - | 40 |
| CO6 | - | - | - | - | 20 | - | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2041** | **Duration** | **3hrs** |
| **Course Name** | **MALWARE ANALYSIS AND ITS SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Classify the types of malware analysis and explain the popular malware analysis tools. | CO1 | U | 12 |
|  | b. | Summarize the types of malicious program. | CO1 | U | 8 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the tools used in identifying static malware analysis. | CO1 | A | 12 |
|  | b. | Illustrate the concept of file obfuscation. | CO1 | U | 8 |
|  |  |  |  |  |  |
| 3. | a. | Explain fingerprinting the malware with its utilities and tools used. | CO2 | U | 15 |
|  | b. | Explain portable executable file. | CO2 | U | 05 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize the usage of yara tool and identify the file using yara for static malware analysis. | CO2 | A | 20 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the advantage of using regshot tool for registry analysis. | CO3 | U | 12 |
|  | b. | Classify malware using fuzzy hash and imphash. | CO3 | U | 08 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the inspection of PE header in executable files. | CO5 | A | 10 |
|  | b. | illustrate about hashing a fingerprint for malware analysis. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the four monitoring techniques used in dynamic analysis. | CO3 | U | 15 |
|  | b. | List the drawbacks of using sandbox. | CO4 | U | 05 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the working of windows registry monitoring. | CO4 | A | 15 |
|  | b. | Summarize on different network protocols. | CO4 | U | 05 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the types of Brute Force Attacks and list the steps to obtain the password. | CO6 | U | 15 |
|  | b. | Compare whois with reverse ip whois. | CO5 | U | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the concept of malware analysis, types of malware analysis and differentiate malware and a virus. |
| CO2 | Classify and compare the malware samples and Extract strings, functions, and metadata associated with the file. |
| CO3 | Use Dynamic analysis tools and understand their features, steps involved in dynamic analysis. |
| CO4 | Determine the possibilities that make experience with sandboxes and multi-AV scanners even better. |
| CO5 | Identify and correlate information regarding domains, hostnames and IP addresses. |
| CO6 | Discuss the challenges encountered in the field of malware analysis. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 28 | 12 | - | - | - | 40 |
| CO2 | - | 20 | 20 | - | - | - | 40 |
| CO3 | - | 35 | - | - | - | - | 35 |
| CO4 | - | 20 | 15 | - | - | - | 35 |
| CO5 | - | 15 | - | - | - | - | 15 |
| CO6 | - | 15 | - | - | - | - | 15 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2042** | **Duration** | **3hrs** |
| **Course Name** | **SECURITY ASSESSMENT OF INFORMATION SYSTEMS THROUGH ETHICAL HACKING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Write short notes on the following  Ping sweep b. Keylogger c. MitM d) Pay Load e) Bot | CO1 | U | 15 |
|  | b. | Describe the elements of Information Security. | CO1 | R | 5 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Define Ethical Hacking. Describe few data breaches that has occurred. | CO1 | R | 5 |
|  | b. | Compare the activities of various types of hackers. | CO1 | An | 15 |
|  |  |  |  |  |  |
| 3. | a. | Explain the following   1. Viruses and its types c) Worms 2. Spy ware and Ad ware d) Session Hijacking | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | With suitable command and attributes discuss how NMAP command is used for Host discovery, Port specification, Target specification. | CO2 | U | 15 |
|  | b. | Distinguish OS Fingerprinting & Banner Grabbing | CO2 | An | 5 |
|  |  |  |  |  |  |
| 5. | a. | With neat diagram explain three tier web application architecture. | CO3 | U | 5 |
|  | b. | Briefly discuss the various authentication and Authorization flaws that occur in web application. | CO3 | R | 15 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Illustrate the various types of password attacks. | CO3 | A | 15 |
|  | b. | Recommend the ways for protecting system from hacking. | CO4 | E | 5 |
|  |  |  |  |  |  |
| 7. | a. | Review the merits and demerits of Three Types of Authentications. | CO4 | E | 8 |
|  | b. | Compare WEP, WPA and WPA2. | CO4 | A | 12 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Recommend the ways for Securing Wireless Networks. | CO5 | E | 8 |
|  | b. | Compare the various types of wireless attacks. | CO5 | A | 12 |

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| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Prepare a list of common Linux Vulnerabilities. | CO6 | U | 6 |
|  | b. | Write any four Linux Information Gathering DNS Tools. | CO6 | R | 8 |
|  | c. | Write notes on RPC and Null sessions. | CO6 | R | 6 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | determine the security threats and vulnerabilities in computer networks using ethical hacking techniques |
| CO2 | identify various attacks in various domains of cyber space |
| CO3 | select the tools to gather the information regarding the vulnerabilities |
| CO4 | use techniques, skills and modern tools necessary to gather the information and to identify the  vulnerabilities. |
| CO5 | discuss about the exploits in various operating systems and Wireless environment. |
| CO6 | identify the vulnerabilities associated with various network applications and database system. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 15 |  | 15 |  |  | 40 |
| CO2 |  | 35 |  | 5 |  |  | 40 |
| CO3 | 15 | 5 | 15 |  |  |  | 35 |
| CO4 |  |  | 12 |  | 13 |  | 25 |
| CO5 |  |  | 12 |  | 8 |  | 20 |
| CO6 | 14 | 6 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2044** | **Duration** | **3hrs** |
| **Course Name** | **CYBER SECURITY GOVERNANCE** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the need of corporate security. | CO1 | U | 10 |
|  | b. | Explain the role of intelligence in corporate security. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Identify any FIVE possible sources of threat from where they originate and detail on them. | CO1 | An | 10 |
|  | b. | List down any FIVE cyber threats that are predominant in the recent days and explain them. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain about any FIVE major corporate governance issues encountered by a software company like CTS. | CO2 | A | 10 |
|  | b. | Recent research by Harvard Business School’s Ethan Rouen found that when CEOs are overpaid and employees feel it’s not justified, company performance suffers. In around one-fifth of the companies studied, the companies overpaid the CEOs. But more importantly, the employees were underpaid.  So, what could be the solution? Provide your recommendations with valid justification. | CO2 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Read the passage and answer the following questions:  A federal agency needed to transform the way it governed and managed IT within the Department. It created three boards: an IT Leadership Board, a Budgeting and Near-Term Issues Board, and a Programming and Long-Term Issues Board. It transformed business frameworks and moved to a more effective and efficient IT environment. It developed a more effective regulatory and governance framework for overall business operations. The framework was for enhanced participation, transparency, and accountability in the alignment of IT to the business and the management of IT itself. It assigned roles and responsibilities for IT management to effectively deal with oversight organizations on IT matters. It institutionalized management practices based on industry best practices described in COBIT® (Control Objectives for Information Technologies), Val IT™ (Value from IT investments) and ITIL® (Information Technology Infrastructure Library).   1. What kind of framework was introduced by the company? Explain. (5 marks) 2. Explain the boards established by the company in detail. (6 marks). 3. Explain the standards used by the company and the possible reasons for using them. (9 marks) | CO2 | An | 20 |
|  |  |  |  |  |  |
| 5. | a. | Explain cyber resilience. Describe the three key components of a Cyber Resiliency Framework. | CO3 | R | 10 |
|  | b. | According to IDC, following is the prediction: “India's public cloud services market to reach $10.8 bn by 2025”. This statement clearly views the associated security and operational risks in cloud.  List down the possible security risks and operational risks found in cloud and explain them. | CO3 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | The Ponemon Institute in the USA, a publisher of reports on cyber, shared the results of their survey on risk management. It is important to note that the 641 who answered the survey were involved in risk management within their organization. Read the facts given below and answer the questions following them. Each question carries two marks.   1. Ponemon tells us that only **24%** of respondents said they have a risk management *strategy* that is clearly defined and pertains to the entire enterprise. **Define risk management strategy.** (3 marks) 2. “…**only 43 percent** of respondents say enterprise risk intelligence integrates well with the way our business leaders make decisions.” **Explain the need of risk intelligence.** (4 marks) 3. **53 percent** of respondents say their *finance, operations, compliance, legal and IT functions* do not collaborate on enterprise risk management activities. **Is collaboration of departments in a company essential? Why or why not?** (3 marks) 4. Only 8 percent of respondents say the functions fully collaborate in enterprise risk management activities.” **What kind of functions are represented here? Why?** (3 marks) 5. “30 percent of respondents say no one person has overall responsibility to ensure the risk management program is well executed”. **Who is responsible for risk management in company? Why?** (4 marks) 6. On a scale or 1 (low) to 10 (high), just 14% of the respondents rated the effectiveness of their risk management activity as a 9 or 10. **What does this data indicate: are there sufficient risk mitigating cybersecurity prevention mechanisms? Justify your answer.** (3 marks) | CO4 | A | 20 |
|  |  |  |  |  |  |
| 7. | a. | Explain COBIT in detail. | CO5 | R | 10 |
|  | b. | Specify any THREE advantages of completing COBIT 5 certification. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain Capability Maturity model and its five maturity levels in detail. | CO5 | R | 10 |
|  | b. | Explain how CMM is applied in cybersecurity. | CO5 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain HIPPA and its importance in detail. | CO6 | U | 8 |
|  | b. | Compare and contrast GLBA and PCI DSS in the US with the respective equivalent acts in India that restrict financial transactions. Explain the context with a suitable case study. Compare the punishments and action taken in both the countries effectively. | CO6 | A | 12 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the basics of cyber security governance |
| CO2 | Develop an Information Security Strategy |
| CO3 | State the need for resilience management |
| CO4 | Describe the existing and emerging security strategy |
| CO5 | Select a governing control or standards framework |
| CO6 | Discuss the various compliance laws |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 20 | 10 | 10 | - | - | 40 |
| CO2 | - | - | 10 | 30 | - | - | 40 |
| CO3 | 10 | - | 10 | - | - | - | 20 |
| CO4 | - | - | 20 | - | - | - | 20 |
| CO5 | 20 | 20 | - | - | - | - | 40 |
| CO6 | - | 8 | 12 | - | - | - | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2045** | **Duration** | **3hrs** |
| **Course Name** | **SECURITY OF WEB APPLICATIONS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the major components of web application. | CO1 | U | 10 |
|  | b. | Explain some common types of attacks that can be launched against web application. | CO2 | U | 10 |
|  |  | (OR) |  |  |  |
| 2. | a. | **Write the purpose of cross-site request forgery (CSRF) attack with example.** | CO2 | U | 10 |
|  | b. | Explain the client-side and server-side scripting with example. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | **Define secure socket layer (SSL) and write its purpose.** | CO6 | U | 10 |
|  | b. | **State the type of authentication can be used in Web application and explain.** | CO4 | U | 10 |
|  |  | (OR) |  |  |  |
| 4. | a. | Explain Same Origin Policy (SOP) principle and how it works. | CO5 | U | 10 |
|  | b. | Describe in detail about SQL injection. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss the types of Protection method used in session cookies. | CO4 | U | 10 |
|  | b. | Summarize the following   1. Log files 2. Web bugs | CO5 | U | 10 |
|  |  | (OR) |  |  |  |
| 6. | a. | Explain the architecture of Web browser. | CO3 | U | 10 |
|  | b. | Describe the following   1. The X.509 v3 Certificate 2. SSL certificate | CO6 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe types of Phishing attacks. | CO3 | U | 10 |
|  | b. | Explain the approaches for Digital Signatures based on Public Key Encryption. | CO4 | U | 10 |
|  |  | (OR) |  |  |  |
| 8. | a. | Explain the different types of physical securities for web servers. | CO6 | U | 10 |
|  | b. | Describe Secure Development Life Cycle. | CO1 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Justify your approach for how web application security solutions help world-renowned companies keep their websites and web applications secure by automatically identifying vulnerabilities and integrating security into development. | CO6 | E | 10 |
|  | b. | Explain different techniques of browser attack. | CO3 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain Web Application architecture and technologies. |
| CO2 | Identify and handle Web Application Attacks. |
| CO3 | Defend web browser from attacks. |
| CO4 | State the importance of web authentication and authorization. |
| CO5 | Exhibit privacy for users. |
| CO6 | Exhibit the skills in securing Web server. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 30 |  |  |  |  | 30 |
| CO2 |  | 30 |  |  |  |  | 30 |
| CO3 |  | 20 |  |  |  |  | 20 |
| CO4 |  | 30 |  |  |  |  | 30 |
| CO5 |  | 20 |  |  |  |  | 30 |
| CO6 |  | 30 |  |  | 10 |  | 40 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2046** | **Duration** | **3hrs** |
| **Course Name** | **DATA MINING IN CYBER SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss the delivery process of a data warehouse. | CO1 | U | 10 |
|  | b. | Define partition and describe the necessary steps involved in horizontal partitioning. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Define schema and identify the types of schemas with schema definitions. | CO1 | R | 10 |
|  | b. | Determine the strategies and challenges in aggregation. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Analyze the different approaches of clustering-based outlier detection. | CO5 | An | 10 |
|  | b. | Classify the different techniques to preserve privacy in association rule mining. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Illustrate the privacy preservation of K-means clustering. | CO5 | U | 10 |
|  | b. | Describe the security applications using stream mining. | CO6 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain Bayes' Theorem and Bayesian Belief Network. | CO3 | An | 10 |
|  | b. | Discuss data mining architectures. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain decision tree induction algorithm. | CO3 | U | 10 |
|  | b. | Examine data mining that can be applied in email worm detection. | CO6 | R | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain the methods of hierarchical clustering. | CO4 | U | 10 |
|  | b. | Categorize the methods used in text mining techniques. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Classify the types of data structures in cluster analysis. | CO4 | U | 10 |
|  | b. | Discuss model-based clusteringin detail. | CO4 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Define metadata and describe the categories of metadata. | CO2 | R | 10 |
|  | b. | Illustrate the types of OLAP systems. | CO2 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | explain various components and processes of data warehouse. |
| CO2 | design and implement Data Warehouse to industrial requirements. |
| CO3 | apply in association rule and classification technique in handling organizational problems. |
| CO4 | identify pattern and knowledge hidden in complex types of data. |
| CO5 | identify and handle anomaly detection in network. |
| CO6 | apply appropriate data mining technique in handling Malware attacks |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 20 | 10 | 10 |  |  |  | 40 |
| CO2 | 10 |  | 10 |  |  |  | 20 |
| CO3 |  | 20 |  | 10 |  |  | 30 |
| CO4 |  | 30 |  | 10 |  |  | 40 |
| CO5 |  | 20 |  | 10 |  |  | 30 |
| CO6 | 10 | 10 |  |  |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **EMAIL AND MOBILE FORENSICS** | **Duration** | **3hrs** |
| **Course Name** | **20CA2047** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Validate the properties of E-Mails that are stored in the mailboxes against at least two parameters with a step – by - step procedure. | CO1 | C | 10 |
|  | b. | Devise a suitable methodology for carrying out E-Mail forensics. | CO2 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Review the purpose of the various types of MIME headers with a suitable diagrammatic representation. | CO1 | R | 10 |
|  | b. | Discuss the steps involved in tracing the E-Mail messages with an explanation on server and network logs. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Distinguish between E-Mail servers and E-Mail clients with respective to their role and categories. | CO1 | E | 10 |
|  | b. | Write short notes on SMTP, POP and IMAP with suitable pictorial representation. | CO3 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Report the effects of hacking and phishing with suitable examples. | CO2 | C | 20 |
|  |  |  |  |  |  |
| 5. | a. | Express the features and benefits of SQLite database with its applications. | CO4 | U | 10 |
|  | b. | Differentiate between the characteristics and uses of any two mobile forensic tools. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Prioritize the various steps involved in handling the Android devices using the Android forensics. | CO5 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Explain the architecture and technologies used in Cellular Networks. | CO5 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Prepare a suitable report on the various parameters involved in the non – traditional and older device acquisition. | CO6 | C | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Examine the role of SPF in transferring the E-Mail messages. | CO4 | A | 15 |
|  | b. | List down the names of any five E-Mail Forensic tools. | CO4 | R | 5 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain the role of client and server in email and the role of email in investigation. |
| CO2 | Identify, analyze and investigate the malicious email. |
| CO3 | State the need to secure the e-mail service. |
| CO4 | Outline Mobile device proliferation and their functionalities. |
| CO5 | Identify and investigate data from mobile devices using forensically sound and industry standard tools. |
| CO6 | Analyze mobile devices, their backup files, and artifacts for forensic evidence. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 10 | - | - | 10 | 10 | 40 |
| CO2 | - | - | - | - | - | 30 | 30 |
| CO3 | - | 10 | - | - | - | - | 10 |
| CO4 | 5 | 10 | 15 | 10 | - | - | 40 |
| CO5 | - | 20 | - | 20 | - | - | 40 |
| CO6 | - | - | - | - | - | 20 | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2048** | **Duration** | **3hrs** |
| **Course Name** | **PYTHON FOR NETWORK AND SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the socket methods available in Python and describe their role in socket programming. | CO1 | U | 10 |
|  | b. | Develop a Python program to download a file from an FTP server. | CO1 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Develop a program to analyze network traffic and highlight a suspect node. Visualize a sample output from your code. | CO2 | An | 20 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate the working of reverse cipher algorithm in encrypting and decrypting a piece of text and implement the algorithm using Python code. | CO4 | A | 10 |
|  | b. | Apply Caesar Cipher to encrypt the text ‘hypothalamus’ using a key value of ‘7’ by working out the algorithm in steps. Implement the algorithm using Python Code. | CO4 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Simulate scenarios to analyze the strengths and weaknesses of symmetric and asymmetric key algorithms. Suggest solutions for overcoming the drawbacks in both cases. | CO4 | An | 20 |
|  |  |  |  |  |  |
| 5. | a. | Explain the process of password cracking or hacking passwords and describe the techniques used for the same. | CO3 | U | 10 |
|  | b. | Develop a Python code to crack passwords. | CO3 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Evaluate the harmful effects caused by various malware. | CO3 | E | 10 |
|  | b. | Compare virus, worms and Trojans using their attributes and functionalities. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Explain any five image enhancement techniques and implement the same using Python code. | CO4 | A | 20 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Illustrate the process of image classification using classification algorithms. | CO4 | An | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Explain the components of Windows Forensic analysis. | CO5 | U | 10 |
|  | b. | Analyze the significance of Django framework in designing e-commerce applications. | CO6 | An | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | write Socket program. |
| CO2 | scan network and gather information. |
| CO3 | perform ethical hacking. |
| CO4 | encrypt and decrypt and validate images. |
| CO5 | perform forensics analysis. |
| CO6 | build e-commerce application. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 10 | 10 | - | - | - | 20 |
| CO2 | - | - | - | 20 | - | - | 20 |
| CO3 | - | 10 | 10 | - | 10 | 10 | 40 |
| CO4 | - | - | 40 | 40 | - | - | 80 |
| CO5 | - | 10 | - | - | - | - | 10 |
| CO6 | - | - | - | 10 | - | - | 10 |
|  | - | 30 | 60 | 70 | 10 | 10 | **180** |



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| **Course Code** | **20CA2050** | **Duration** | **3hrs** |
| **Course Name** | **CLOUD SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Write in detail the advantages of cloud computing. | CO1 | A | 10 |
|  | b. | Describe the technological influences of cloud computing. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the business continuity and disaster recovery planning. | CO2 | An | 20 |
|  |  |  |  |  |  |
| 3. | a. | Discuss the services of cloud security. | CO2 | U | 10 |
|  | b. | Analyze CIA triad and cloud service risk provider. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe how automatic security and virtualization security management supports cloud computing. | CO4 | R | 20 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the privacy and compliance risks in cloud computing. | CO3 | A | 10 |
|  | b. | Tabulate the key facts of cloud service risk providers. | CO4 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Justify the importance of Industry Standards Organizations and groups associated with cloud computing. | CO5 | E | 20 |
|  |  |  |  |  |  |
| 7. | a. | Articulate the key management in cloud computing. | CO5 | A | 10 |
|  | b. | Explain the Legal issues in commercial and business considerations of cloud computing. | CO6 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Assess the need for financial controls, logging and auditing in governance of cloud. | CO6 | E | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Interpret the cloud computing risk issues with suitable examples. | CO3 | U | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Compare the deployment models versus service models of cloud computing. |
| CO2 | Illustrate the architecture and categorize the services using cloud computing. |
| CO3 | Identify the known threats, risks, vulnerabilities and privacy issues associated with cloud-based IT services. |
| CO4 | Explain the concepts and guiding principles for designing and implementing appropriate safeguards  and countermeasures for cloud-based IT services. |
| CO5 | Describe the industry security standards, regulatory mandates, audit policies and compliance  requirements for cloud-based infrastructures. |
| CO6 | State the governance in the cloud. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 10 | 10 |  |  |  | 20 |
| CO2 | 10 |  |  | 20 |  |  | 30 |
| CO3 |  | 20 | 10 | 10 |  |  | 40 |
| CO4 | 30 |  |  |  |  |  | 30 |
| CO5 |  |  | 10 |  | 20 |  | 30 |
| CO6 |  |  |  | 10 | 20 |  | 30 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA2052** | **Duration** | **3hrs** |
| **Course Name** | **INFORMATION SECURITY ETHICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the ethics maintained in decision-making in the IT industry. | CO1 | U | 10 |
|  | b. | Enumerate the acts enacted for implementing privacy. | CO1 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the privacy issues faced in the workplace and during internet usage. | CO1 | U | 10 |
|  | b. | Discuss the smartphone ethics and ontology. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Outline the ethics maintained among IT professionals. | CO2 | U | 10 |
|  | b. | Explain the key privacy and anonymity issues we face with the advancement in technology. | CO2 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Formulate the code of ethics to be followed by teachers and lawyers. | CO2 | C | 10 |
|  | b. | Summarize the professional code of ethics to be followed in organizations. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain the software development process. | CO6 | U | 10 |
|  | b. | Compare plagiarism and reverse engineering. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Elaborate the intellectual property rights and the acts associated with it. | CO4 | U | 10 |
|  | b. | Illustrate the ethical considerations surrounding the Internet of Things. | CO4 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Determine the ethical issues in research using human and animal subjects. | CO4 | R | 10 |
|  | b. | Enumerate professional rights in the field of IT. | CO5 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Formulate the code of ethics to be followed by doctors. | CO5 | C | 10 |
|  | b. | Analyze the issues in developing a safety-critical system. | CO6 | An | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Compare utilitarianism and deontology. | CO6 | An | 10 |
|  | b. | Explain privacy issues in the usage of the Internet of Things with a real-world example. | CO3 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | identify the issues of professional conduct in information technology. |
| CO2 | analyses the relationship with machines, and in particular with the technological devices that we use most in our everyday communication. |
| CO3 | assess the impact of the privacy laws. |
| CO4 | illustrate the issues related to intellectual property. |
| CO5 | adapt several codes of ethics, from general to specific in nature. |
| CO6 | state the ethical issues that the software manufacturers face in making trade-offs between project schedules, project costs, and software quality. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 10 | 20 |  |  |  |  | 30 |
| CO2 |  | 30 |  |  |  | 10 | 40 |
| CO3 |  | 20 |  | 10 |  |  | 30 |
| CO4 | 10 | 20 |  |  |  |  | 30 |
| CO5 | 10 |  |  |  |  | 10 | 20 |
| CO6 |  | 10 |  | 20 |  |  | 30 |
|  | | | | | | | **180** |



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| --- | --- | --- | --- |
| **Course Code** | **20CA3014** | **Duration** | **3hrs** |
| **Course Name** | **INFORMATION SECURITY GOVERNANCE, RISK AND COMPLIANCE** | **Max. Marks** | **100** |

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| --- | --- | --- | --- | --- | --- |
| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discriminate the information security governance in detail. | CO1 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Paraphrase about COBIT. | CO2 | U | 10 |
|  | b. | Explain about Enterprise Security Program Framework. | CO2 | An | 10 |
|  |  |  |  |  |  |
| 3. | a. | Describe the different steps for conducting a risk assessment. | CO3 | U | 10 |
|  | b. | Paraphrase the goals, benefits and best practices of information security governance. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain about the 8 P’s of product marketing and 4 S’s of service. | CO3 | U | 10 |
|  | b. | Categorize, how and when the risk assessment can be done. | CO3 | An | 10 |
|  |  |  |  |  |  |
| 5. | a. | Discuss about the security controls. | CO4 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe about the compliance laws. | CO5 | U | 20 |
|  |  |  |  |  |  |
| 7. | a. | Discuss about the financial management. | CO6 | U | 10 |
|  | b. | Analyze the information security management. | CO6 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Describe about the FISMA in detail. | CO5 | U | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Manipulate the various features of octave in detail. | CO5 | A | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

|  |  |
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|  | **COURSE OUTCOMES** |
| CO1 | Explain Information Security Governance, Risk & Compliance. |
| CO2 | Develop an information security strategy. |
| CO3 | Determine and manage acceptable risk and select the appropriate, risk-based controls that align to the laws and frameworks. |
| CO4 | Create a security-aware culture. |
| CO5 | Discuss the existing and emerging laws and regulations impacting the organization. |
| CO6 | Prepare for and leverage internal and external audits to enhance processes. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  |  |  | 20 |  |  | 20 |
| CO2 |  | 10 |  | 10 |  |  | 20 |
| CO3 |  | 20 |  | 10 |  |  | 30 |
| CO4 |  | 30 |  |  |  |  | 30 |
| CO5 |  | 40 | 20 |  |  |  | 60 |
| CO6 |  | 10 |  | 10 |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA3018** | **Duration** | **3hrs** |
| **Course Name** | **ETHICAL HACKING** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the top information security attack vectors. | CO1 | R | 10 |
|  | b. | Explain the various phases of network Vulnerability assessment methodology. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Summarize all the activities performed by various types of hackers. | CO2 | U | 12 |
|  | b. | Compare the various categories of information security threats. | CO2 | R | 8 |
|  |  |  |  |  |  |
| 3. | a. | Illustrate the use of Network Map commands with syntax and examples in target specification, Port specification and host discovery. | CO3 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize the various types of password attacks with examples. | CO4 | U | 12 |
|  | b. | List down the various ways by which system can be protected from hacking. | CO4 | A | 8 |
|  |  |  |  |  |  |
| 5. | a. | Distinguish the various tools used for sniffing. Explain HTML injection. | CO5 | R | 15 |
|  | b. | Attackers often use social engineering methods to pin point your location while you are from a mobile device- Defend how this is accomplished. | CO5 | E | 5 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Define Web Application. Why web servers are compromised? Summarize various web vulnerabilities and threats. | CO2 | A | 15 |
|  | b. | Explain SQL injection. Write the three types of SQL Injection. | CO1 | R | 5 |
|  |  |  |  |  |  |
| 7. | a. | Write about Operating system hardening and various ways by which windows OS can be protected. | CO4 | A | 5 |
|  | b. | Explain Wi-Fi security protocols that secure wireless connections and describe A) Evil Twin attack, B) Jamming Signals, C) Misconfiguration Attacks, D) Honey spot Attack. | CO3 | U | 15 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | What is Honeypot? How does it work? What are the different types of Honeypots? | CO5 | U | 15 |
|  | b. | Write notes on demilitarized zones. | CO6 | C | 5 |
| **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Defend how networks are defended using SNORT, an Intrusion Detection tool. | CO6 | E | 10 |
|  | b. | What is Report Writing? Write an essay on report writing stages. | CO6 | C | 10 |

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|  | **COURSE OUTCOMES** |
| CO1 | determine the security threats and vulnerabilities in computer networks using ethical hacking techniques |
| CO2 | identify various attacks in various domains of cyber space |
| CO3 | use the tools that can be used to perform information gathering |
| CO4 | explain the exploits in various operating systems and Wireless environment |
| CO5 | identify the vulnerabilities associated with various network applications and database system |
| CO6 | Comprehend report writing procedure. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| CO / P | **Remember** | **Understand** | **Apply** | **Analyze** | **Evaluate** | **Create** | **Total** |
| CO1 | 15 | 10 |  |  |  |  | 25 |
| CO2 | 8 | 12 | 15 |  |  |  | 35 |
| CO3 |  | 15 |  | 20 |  |  | 35 |
| CO4 |  | 12 | 13 |  |  |  | 25 |
| CO5 | 15 | 15 |  |  | 5 |  | 35 |
| CO6 |  |  |  |  | 10 | 15 | 25 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA3020** | **Duration** | **3hrs** |
| **Course Name** | **PYTHON FOR CYBERSECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Justify that numpy is a powerful library for matrix operations using suitable examples on matrix operators and matrix functions. | CO1 | E | 10 |
|  | b. | Explain the operations on data frames that are supported by Pandas functions using suitable examples. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Illustrate how data can be manipulated in a series using Pandas functions. | CO1 | A | 10 |
|  | b. | Develop the Python code to do the following operations:  i. Create a Pandas DataFrame named "student\_data" that contains information about student records. The DataFrame should the following columns: Regno, Name, Maths, English, Programming, EVS and Entrepreneurship.  ii. Add 5-10 sample data to the records.  iii. Calculate the average marks for each subject.  iv. Calculate the total marks for each student.  v. Display the maximum marks for ‘Programming’. | CO1 | A | 10 |
|  |  |  |  |  |  |
| 3. | a. | Analyze the process of data wrangling of merging datasets in various ways highlighting the difference between each type of join. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Consider a Pandas DataFrame named "sales\_data" that contains information about sales transactions for a retail business. It has the following columns: "Date," "Product," "Units Sold," "Unit Price," and "Total Sales." Develop the code to do the following operations:   1. Load the data from a CSV file named "sales\_data.csv" into the DataFrame. 2. Display the first 5 rows of the DataFrame to provide an overview of the data. 3. Check for missing values and handle them appropriately. 4. Calculate the total sales for each product and create a new DataFrame or Series that summarizes this information. 5. Find the product with the highest total sales and display its details. 6. Determine the total number of units sold in the dataset. 7. Group the data by month and calculate the total sales for each month. 8. Create a bar chart to visualize the total sales for each product. 9. Plot a line chart to show the trend in total sales over time (use the "Date" column). 10. Save the updated DataFrame to a new CSV file named "processed\_sales\_data.csv." | CO2 | A | 20 |
|  |  |  |  |  |  |
| 5. | a. | Examine how penetration testing can be used for identifying vulnerabilities of sniffing attacks. | CO3 | An | 10 |
|  | b. | Develop Python codes to perform pen-testing by scanning ports and using ping sweeps. | CO3 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Explain the process of penetration testing of Wi-Fi networks. | CO3 | U | 10 |
|  | b. | Apply Caesar Cipher algorithm to encrypt the term ‘cryptography’ and work out the step-by-step processes to get the cipher text. | CO3 | A | 10 |
|  |  |  |  |  |  |
| 7. | a. | Evaluate the working of AES algorithm for encryption and decryption of data. | CO4 | E | 10 |
|  | b. | Develop a chat application by deploying a HTTP server and a client. | CO5 | C | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Discuss the process of detecting and exploiting SQL injection vulnerabilities. | CO4 | U | 10 |
|  | b. | Develop a python code to encrypt an image and decrypt the encrypted image. | CO5 | A | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Categorize the different types of spoofing attacks and discuss the methods to protect your resources from such attacks. | CO6 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** | | | | | | | |
| CO1 | use Python in data analysis using NumPy, IPython and Pandas. | | | | | | | |
| CO2 | gain knowledge on Python’s role in data preparation, data visualization and statistical computations. | | | | | | | |
| CO3 | explain the Web Application Security, which includes Cross-Site Scripting Attacks, Cross-Site  Request Forgery, SQL Injection Attacks. | | | | | | | |
| CO4 | describe crypto primitives and their applications. | | | | | | | |
| CO5 | outline the process behind web pen-testing. | | | | | | | |
| CO6 | discuss the role ethical hacking plays in providing secure and robust networks. | | | | | | | |
| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | | |
| **CO / P** | | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | | - | 10 | 20 | - | 10 | - | 40 |
| CO2 | | - | - | 20 | 20 | - | - | 40 |
| CO3 | | - | 10 | 10 | 10 | - | 10 | 40 |
| CO4 | | - | 10 | - | - | 10 | - | 20 |
| CO5 | | - | - | 10 | - | - | 10 | 20 |
| CO6 | | - | - | - | 20 | - | - | 20 |
|  | | - | 30 | 60 | 50 | 20 | 20 | **180** |



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| **Course Code** | **20CA3022** | **Duration** | **3hrs** |
| **Course Name** | **SECURITY IN THE CLOUD** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Describe the NIST cloud computing reference architecture. | CO1 | R | 10 |
|  | b. | Explain the characteristics of Cloud delivery models in detail. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Tabulate the important elements in the types of cloud with suitable examples. | CO1 | R | 20 |
|  |  |  |  |  |  |
| 3. | a. | Articulate the basics of virtualization implementation levels. | CO2 | A | 10 |
|  | b. | Describe the concept of Virtual Clusters and resource management. | CO2 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Summarize virtualization for data center automation. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 5. | a. | Explain resource provisioning and platform deployment. | CO3 | A | 10 |
|  | b. | Analyze about global exchange of cloud resources. | CO3 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Assess Google App Engine, Amazon AWS, Eucalyptus, Open Nebula, OpenStack, Aneka and Cloud Sim. | CO4 | E | 20 |
|  |  |  |  |  |  |
| 7. | a. | Evaluate the concepts of mapping applications in detail. | CO4 | E | 10 |
|  | b. | Write about cloud trust protocol and cloud control matrix. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Differentiate mitigating controls and autonomic security in detail. | CO5 | An | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Analyze the need for IT governance in cloud computing, Legal issues in commercial and business considerations. | CO6 | An | 20 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Compare deployment models versus service models of cloud computing. |
| CO2 | Apply suitable virtualization concept. |
| CO3 | Design and Compute the Storage Clouds. |
| CO4 | Use Programming model. |
| CO5 | Debate the security risks associated with the cloud. |
| CO6 | Discuss the governance and the legal issues in the cloud. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | 30 | 10 |  |  |  |  | 40 |
| CO2 | 10 | 20 | 10 |  |  |  | 40 |
| CO3 |  |  | 10 | 10 |  |  | 20 |
| CO4 |  |  |  |  | 30 |  | 30 |
| CO5 |  |  | 10 | 20 |  |  | 30 |
| CO6 |  |  |  | 20 |  |  | 20 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA3024** | **Duration** | **3hrs** |
| **Course Name** | **SOCIAL MEDIA CRIMES** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Discuss the emergence of social networking sites and analyze its future with suitable examples. | CO1 | An | 10 |
|  | b. | List out the advantages of Web 2.0 and Web 3.0. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Write short notes on:   1. Blogs & Microblogs. 2. Virtual Social Worlds 3. Content Communities 4. Virtual Game Worlds | CO1 | U | 20 |
|  |  |  |  |  |  |
| 3. | a. | Classify the social networking sites through their application with suitable examples. | CO2 | An | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Write short notes on the following:   1. Social networking sites. 2. Social review sites. | CO2 | U | 20 |
|  |  |  |  |  |  |
| 5. | a. | Illustrate the use of social media in advertising platforms through suitable examples. | CO3 | A | 10 |
|  | b. | List and explain the different types of services rendered through social media with relevant examples. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Analyze the use of social networking sites for small-scale and large-scale businesses. | CO3 | An | 20 |
|  |  |  |  |  |  |
| 7. | a. | Design a comprehensive educational program aimed at preventing social media crimes against women. | CO4 | C | 10 |
|  | b. | Infer the causes, consequences, and countermeasures of Non-Consensual Pornography. | CO4 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Analyze the role of social media platforms in addressing and preventing crimes against women. | CO4 | An | 10 |
|  | b. | Discuss the common types of social media crimes against women. | CO4 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Identify the potential signs of online frauds targeting a youth. | CO5 | A | 10 |
|  | b. | Describe a real-life scenario where moral policing may infringe upon individual rights and freedom. | CO6 | A | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Explain about media, social media and social networks. |
| CO2 | Describe different types of social media and their vulnerabilities. |
| CO3 | Analyze the various services of social media, usage and their promotions. |
| CO4 | Discuss social media and crimes against Women and Children. |
| CO5 | Tell the other forms of social media such as online frauds, financial frauds, Digital cloning frauds, identity theft data privacy and legal measures to prevent social media crimes. |
| CO6 | Outline the response of the Criminal Justice System towards the social networking sites. |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 | - | 30 | - | 10 | - | - | 40 |
| CO2 | - | 20 | - | 20 | - | - | 40 |
| CO3 | 10 | - | 10 | 20 | - | - | 40 |
| CO4 | - | 10 | - | 20 | - | 10 | 40 |
| CO5 | - | - | 10 | - | - | - | 10 |
| CO6 | - | - | 10 | - | - | - | 10 |
|  | | | | | | | **180** |



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| **Course Code** | **20CA3025** | **Duration** | **3hrs** |
| **Course Name** | **DIGITAL SECURITY** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the authentication which can be applied in day-to-day life. | CO1 | U | 10 |
|  | b. | Examine the privacy of an individual in terms of digital security. | CO1 | An | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Examine the datamining architecture. | CO1 | A | 10 |
|  | b. | Describe the various application of data mining. | CO1 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain the E-commerce and the application of different payment method in detail. | CO2 | U | 20 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Describe the Health Information Exchange. | CO3 | U | 10 |
|  | b. | Explain the Confidentiality and Security of E-healthcare in detail. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Examine the privacy on the web among the student community in detail. | CO1 | An | 10 |
|  | b. | Appraise the importance of E-learning among the student communities. | CO4 | E | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Experiment the relevance of MOOCs in Indian context. | CO4 | An | 10 |
|  | b. | Examine the mobile security threats faced by the society. | CO4 | An | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe the key elements and benefits of blockchain. | CO5 | U | 10 |
|  | b. | Demonstrate how blockchain works with the suitable diagram. | CO5 | A | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the need, benefits and scope of smart cities. | CO6 | U | 20 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Recognize smart city in the Indian context. | CO6 | U | 10 |
|  | b. | Defend “Coimbatore as smart city”. | CO6 | E | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Recommend suitable controls and procedures for ensuring privacy and security. |
| CO2 | Explain current e-commerce security threats faced by the organization and how to combat the  threats |
| CO3 | Apply best practices and solutions required to manage the security of the healthcare data |
| CO4 | Demonstrate the ability to select and design security solutions to the E-Learning module |
| CO5 | Generate knowledge about various operations associated with the life cycle of Blockchain and  Cryptocurrency |
| CO6 | Outline key issues with the development of smart cities |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 | 10 | 20 |  |  | 50 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 |  | 20 |  |  |  |  | 20 |
| CO4 |  |  |  | 20 | 10 |  | 30 |
| CO5 |  | 10 | 10 |  |  |  | 20 |
| CO6 |  | 30 |  |  | 10 |  | 40 |
|  | | | | | | | **180** |



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| --- | --- | --- | --- |
| **Course Code** | **20CA3026** | **Duration** | **3hrs** |
| **Course Name** | **MACHINE LEARNING AND DATA ANALYTICS** | **Max. Marks** | **100** |

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| **Q. No.** | **Questions** | | **CO** | **BL** | **Marks** |
| **PART – A (4 X 20 = 80 MARKS)**  **(Answer all the Questions)** | | | | | |
| 1. | a. | Explain the types of Machine Learning Models. | CO1 | U | 10 |
|  | b. | Describe different activation functions and network topology. | CO1 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 2. | a. | Explain the evaluation technology of machine learning algorithm. | CO2 | U | 10 |
|  | b. | Explain different types of learning using suitable real-world examples. | CO2 | U | 10 |
|  |  |  |  |  |  |
| 3. | a. | Explain how to estimate a linear regression model. | CO3 | U | 10 |
|  | b. | Write the algorithm for Back propagation with example. | CO3 | R | 10 |
|  |  | **(OR)** |  |  |  |
| 4. | a. | Explain the concept of different layers in Neural network. | CO3 | R | 10 |
|  | b. | Discuss in detail about the decision tree induction algorithm. | CO3 | U | 10 |
|  |  |  |  |  |  |
| 5. | a. | Explain how a support vector machine can be used for classification of linearly separable data. | CO4 | U | 10 |
|  | b. | Discuss Key idea of the support vector machine. | CO4 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 6. | a. | Describe K-nearest Neighbour learning Algorithm for continues valued target function. | CO4 | U | 10 |
|  | b. | Explain the concept of Reinforcement Learning and its framework in  details  Explain the concept of Reinforcement Learning and its framework in details | CO5 | U | 10 |
|  |  |  |  |  |  |
| 7. | a. | Describe various types of Big Data Analytics and explain about Predictive Analytics. | CO5 | U | 10 |
|  | b. | Explain the concept of a Perceptron with a neat diagram. | CO5 | U | 10 |
|  |  | **(OR)** |  |  |  |
| 8. | a. | Explain the concept of perceptron and its sigmoid activation function in brief. | CO6 | U | 10 |
|  | b. | Describe how Principal Component Analysis (PCA) is carried out to reduce the dimensionality of data set. | CO6 | U | 10 |
| **PART – B (1 X 20 = 20 MARKS)**  **COMPULSORY QUESTION** | | | | | |
| 9. | a. | Find the three clusters after one epoch for the following eight examples using the kmeans algorithm and Euclidean distance: A1 = (2,10), A2 = (2,5), A3 = (8,4), A4 = (5,8), A5 = (7,5), A6 = (6,4), A7 = (1,2), A8 = (4,9). Suppose that the initial seeds (centres of each cluster) are A1, A4 and A7 | CO6 | A | 10 |
|  | b. | Explain Bayesian belief network and conditional independence with example. | CO4 | U | 10 |

**CO** – COURSE OUTCOME **BL** – BLOOM’S LEVEL

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|  | **COURSE OUTCOMES** |
| CO1 | Summarize the concepts of machine learning. |
| CO2 | Apply dimensionality reduction. |
| CO3 | Summarize the concepts of neural networks. |
| CO4 | Elaborate supervised and unsupervised algorithms. |
| CO5 | Apply machine learning for predictive analytics |
| CO6 | Analyze the processed data |

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| **Assessment Pattern as per Bloom’s Taxonomy** | | | | | | | |
| **CO / P** | **R** | **U** | **A** | **An** | **E** | **C** | **Total** |
| CO1 |  | 20 |  |  |  |  | 20 |
| CO2 |  | 20 |  |  |  |  | 20 |
| CO3 | 20 | 20 |  |  |  |  | 40 |
| CO4 |  | 40 |  |  |  |  | 40 |
| CO5 |  | 30 |  |  |  |  | 30 |
| CO6 |  | 20 | 10 |  |  |  | 30 |
|  | | | | | | | **180** |