Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **15MA3017** | **Duration :** | **3hrs** |
| **Sub. Name :** | **MATHEMATICS FOR COMPETITIVE EXAMINATIONS** | **Max. Marks :** | **100** |

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

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Find the least five digit number which is exactly divisible by 12, 15 and 18. | CO2 | 8 |
| b. | In how many different ways can the letters of the word 'ENGINEERING' be arranged in such a way that the vowels always come together? | CO2 | 8 |
| c. | In a group of 6 boys and 4 girls, four children are to be selected. Find the probability that there is at least one girl. | CO3 | 4 |
| **(OR)** | | | | |
| 2. | a. | The ratio between two numbers is 3:4. If each number be increased by 5, the ratio becomes 4:5. Find the two numbers. | CO1 | 8 |
| b. | A, B and C started a business investing Rs.42,000, Rs. 30,000 and Rs. 28,000 respectively. After 4 months, A withdrew Rs.12,000, B withdrew Rs.6,000 and C withdrew Rs.8,000. If, after 10 months, a total profit of Rs. 46,420 is earned, what is the share of C? | CO1 | 8 |
| c. | If  then find the value of x. | CO2 | 4 |
|  |  |  |  |  |
| 3. | a. | 30% of A’s salary is equal to 20% of 3/5th of B’s salary. If B’s salary is Rs. 2400, what is A’s salary? | CO1 | 8 |
| b. | The average of two numbers A and B is 20, that of B and C is 19 and of C and A is 21. What is the value of A? | CO1 | 8 |
| c. | Simplify: | CO1 | 4 |
| **(OR)** | | | | |
| 4. | a. | The ratio of the age of Tina and her mother is 1:2. After 6 years ratio of their ages be 11:20. 9 years before, what was the ratio of their ages? | CO4 | 8 |
| b. | Rajiv sold two books at the rate of Rs.1.40 each. He sells one book on 20% profit and other on 20% loss. Find his gain or loss percent. | CO1 | 8 |
| c. | Find the value of | CO2 | 4 |
|  |  |  |  |  |
| 5. | a. | The Simple Interest on certain sum for 2 years at 5% per annum is Rs.300. What is the extra money gained as interest if the rate is 8% per annum on the same sum for 2 years? | CO1 | 8 |
| b. | A can lay railway track between two given stations in 16 days and B can do the same job in 12 days, with help of C, they did the job in 4 days only. In how many days C alone can do the job? | CO4 | 8 |
| c. | What is the angle formed by the hour hand and minute hand of the clock, if the time is 4.20? | CO2 | 4 |
| **(OR)** | | | | |
| 6. | a. | Two pipes A and B can fill the tank in 15 hours and 20 hours respectively while a third pipe C can empty the tank in 25 hours. All the three pipes are opened in the beginning. After 10 hours, C is closed. Find the time taken to fill the tank. | CO4 | 8 |
| b. | At what time between 4 and 5 O’ clock will the hand of the clock be at right angle? | CO3 | 8 |
| c. | In what proportion must wheat at Rs. 17 per kg be mixed with wheat at Rs.14 per kg, so that the mixture be worth Rs.15 per kg? | CO1 | 4 |
|  |  |  |  |  |
| 7. | a. | Two trains running in the same direction at 40 kmph and 22 kmph completely pass one another in one minute. If the length of first train is 125 m, then find the length of the second train. | CO4 | 8 |
| b. | The current of a stream runs at the rate of 4 kmph. A boat goes 6 km and back to the starting point in 2 hours. Find the speed of the boat in still water. | CO4 | 8 |
| c. | X covers a certain distance in 14 hrs 40 min. He covers one half of the distance by train at 60 kmph and rest half by road at 50 kmph. Find the distance travelled by him. | CO4 | 4 |
| **(OR)** | | | | |
| 8. | a. | On the same side of a tower, two objects are located. Observed from the top of the tower, their angles of depression are 45° and 60°. If the height of the tower is 600 m, find the distance between the objects. | CO4 | 8 |
| b. | Find the day of the week on 26th April, 1995. | CO3 | 8 |
| c. | If cos θ + sec θ = 2, find the value of θ. | CO4 | 4 |
|  | | **Compulsory**: |  |  |
| 9. | a. | The table represent gross profit and net profit (in thousands) for the period 1990-1993.   |  |  |  | | --- | --- | --- | | Year | Gross profit | Net profit | | 1990 | 30 | 10 | | 1991 | 40 | 25 | | 1992 | 45 | 25 | | 1993 | 60 | 30 |   Answer the following:  i) Find the percentage of the difference in the two profits over  average gross profit for the entire period (1990-1993).  ii) Find the average annual growth of gross profit in Rs.  iii) In which year the net profit is half of the gross profit.  iv) Find the ratio of total net profit to the total gross profit for the  period 1990-93.  v) In which year does the net profit increase more than the gross  profit? | CO3 | 10 |
| b. | What is the unit digit in | CO2 | 5 |
| c. | The sum of two numbers is twice their difference. If one of the numbers is 10, find the next number. | CO2 | 5 |