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



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

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| **Code :** | **18CE2008** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ENGINEERING MECHANICS – STATICS AND DYNAMICS** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | **Course Outcome** | **Marks** |
| **PART – A (10X1 = 10 MARKS)** | | | |
| 1. | Define moment of inertia of a body. | CO1 | 1 |
| 2. | Distinguish between centroid and centre of gravity. | CO1 | 1 |
| 3. | Write the equation of motion of a particle under gravity. | CO2 | 1 |
| 4. | Differentiate between Rectilinear motion and Curvilinear motion. | CO2 | 1 |
| 5. | State Newton’s law of motion. | CO3 | 1 |
| 6. | How the motion of a lift is analysed? | CO4 | 1 |
| 7. | Define statically indeterminate structure. | CO4 | 1 |
| 8. | Classify the trusses based on supports. | CO5 | 1 |
| 9. | Define statically determinate beam. | CO6 | 1 |
| 10. | List the different types of supports. | CO6 | 1 |

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| **PART – B (6 X 3 = 18 MARKS)** | | | |
| 11. | Determine the moment of inertia for a rectangular section of breadth 300mm and depth 500mm about XX and YY axis. | CO1 | 3 |
| 12. | A stone is dropped from the top of the tower, reaches the ground in 10 seconds. Find the height of the tower. | CO2 | 3 |
| 13. | A body of mass 5.5kg is at rest. What force should be applied to move it to a distance of 12m in 4 seconds? | CO3 | 3 |
| 14. | List out the assumptions made in the analysis of perfect frames. | CO4 | 3 |
| 15. | Determine the support reactions of statically determinate beams. | CO5 | 3 |
| 16. | A rod of 5m long, 40mm wide and 30mm thick is subjected to an axial pull of 30kN in the direction of its length. Find the change in length. Take E- 2x105N/mm2, poisson’s ratio =0.32. | CO6 | 3 |

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| **PART – C (6 X 12 = 12 MARKS)**  **(Answer any five Questions from Q.no 17 to 23. Q.No 24 is a Compulsory Question)** | | | | |
| 17. |  | Locate the centroid of the plane lamina shown in figure given below. | CO1 | 12 |
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| 18. | a. | A stone is projected upwards from the roof of a building with a velocity of 19.6m/s and another stone is thrown downwards from the same point, three seconds later. If both the stones reach the ground at the same time, determine the height of the building. Take g = 9.8m/s2. | CO4 | 6 |
| b. | A particle start from rest with an acceleration given by the relation, a = m/s2 where v is the velocity of particle in m/s. Determine the distance covered by the particle when it acquires a velocity of 72km/hour. | CO4 | 6 |
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| 19. |  | The given figure shows two blocks of weight 60N and 140N, placed on two inclined surfaces and connected by an inextensible string. Calculate the acceleration of the system and the tension in the string. Take µ = 0.2. | CO2 | 12 |
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| 20. |  | Determine the forces in all the members of the truss shown in figure by method of joints. | CO3 | 12 |
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| 21. |  | A simply supported overhanging beam 20m long carries a system of loads and a couple as shown in figure. Determine the reactions at supports A and B. | CO3 | 12 |
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| 22. |  | Find the moment of inertia of plane area shown in figure given below about its centroidal axes. | CO5 | 12 |
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| 23. |  | Two weighs 80N and 20N are connected by a thread and move along a rough horizontal plane under the action of force 40N, applied to the first weight of 80N as shown in figure. The coefficient of friction between the sliding surfaces of the weights and the plane is 0.3. Determine the acceleration of the weights and the tension in the thread using D’Alembert’s Principle. | CO5 | 12 |
|  | **Compulsory:** | | | |
| 24. | a. | A member LMNP is subjected to point loads as shown in fig. Calculate  i) Force P necessary for equilibrium ii) Total elongation of the bar.  Take E = 210GN/m2. | CO6 | 12 |