



MUMBAI-11-271802

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BTech
(SEM II) THEORY EXAMINATION 2021-22
ENGG MECHANICS

Time: 3 Hours

Total Marks: 100

Notes:

- Attempt all Sections and Assume any missing data.
- Appropriate marks are allotted to each question, answer accordingly.

| SECTION - A | Attempt ALL of the following Questions in brief | Marks(10X2=20) |
|-------------|--|----------------|
| Q21(a) | State Varignon's theorem. | |
| Q21(b) | Explain coplanar non concurrent forces. Also write the equilibrium conditions for it. | |
| Q21(c) | Explain centroid's law of rotation. | |
| Q21(d) | Explain the types of beams. | |
| Q21(e) | Explain the laws of perfect, imperfect and indeterminate truss. | |
| Q21(f) | State and explain parallel axis theorem. | |
| Q21(g) | Where does the position of centre of gravity of semi-circular area lie? | |
| Q21(h) | Explain D'Alembert's principle. | |
| Q21(i) | State the Work-Energy principle. | |
| Q21(j) | What is the relationship between shear force and bending moment? | |
| SECTION - B | Attempt ANY THREE of the following Questions | Marks(5X10=50) |
| Q21(a) | The forces 20 N, 30 N, 40 N, 50 N and 60 N are acting at one of the vertices of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant force. | |
| Q21(b) | A plate is loaded and supported as shown in Figure. Determine the nature and magnitude of the forces in the members 1, 2 and 3. | |
| Q21(c) | Two cylinders of diameter 100 mm and 50 mm, weighing 100 N and 50N, respectively are placed in a trough as shown in Figure. Neglect friction. Find the reactions at contact surfaces 1, 2, 3 and 4. | |
| Q21(d) | A solid cylindrical pulley of mass 400 kg, having 0.5 m, radius of gyration 2 m diameter, is rotated by an electric motor, which exerts a uniform torque of 60 kN m. A load of mass 3000 kg is to be lifted by a wire wrapped round the pulley. Find (i) acceleration of the body, and (ii) tension in the rope. | |
| Q21(e) | Draw the SFD and BMD of the overhanging beam loaded as shown in the figure. | |