**Q.P. Code:** 18CE0101 **R18**

**Reg. No:** | | | | | | | | | | |

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

(AUTONOMOUS)

**B.Tech I Year II Semester Regular Examinations May 2019**

**ENGINEERING MECHANICS**

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 60

**PART-A**

(Answer all the Questions **5 x 2 = 10** Marks)

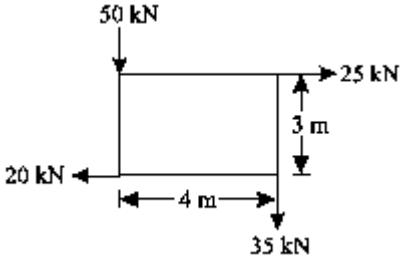
| | | | |
|---|---|---|---|
| **1** | **a** | Classify different types of Force Systems. | 2M |
| | **b** | Define the following: (a) Angle of Friction (b) Angle of Repose | 2M |
| | **c** | Define the following terms: (a) Centroid (b)Center of gravity | 2M |
| | **d** | State the following theorems: (a) Parallel Axis Theorem (b) Perpendicular Axis Theorem | 2M |
| | **e** | How method of joint differs from the method of section in the analysis of pin jointed trusses? | 2M |

**PART-B**

(Answer all Five Units 5 x 10 = 50 Marks)

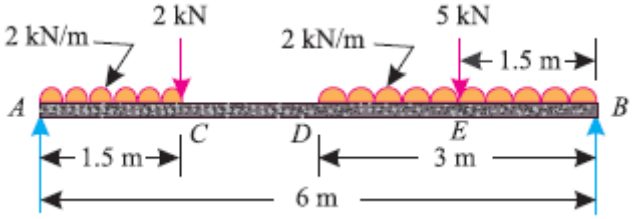
**UNIT-I**

| | | | |
|---|---|---|---|
| **2** | **a** | State and prove parallelogram law of forces. | 5M |
| | **b** | A system of forces is acting at the corners of a rectangular block as shown in Figure. Determine the magnitude and direction of the resultant force. | 5M |




**OR**

| | | | |
|---|---|---|---|
| **3** | | A simply supported beam AB of span 6 m is loaded as shown in Figure. Determine the reactions at A and B. | 10 M |




**UNIT-II**

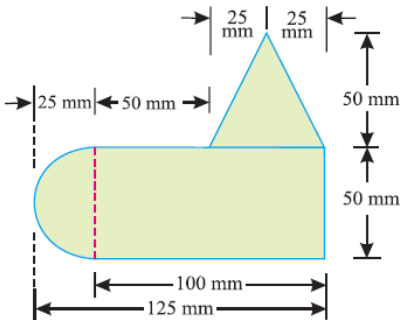
| | | | |
|---|---|---|---|
| **4** | **a** | Write short note on differential screw jack with a neat sketch. | 6M |
| | **b** | A screw jack raises a load of 40 KN. The screw is square threaded having three threads per 20 mm length and 40 mm in diameter. Calculate the force required at the end of a lever 400 mm long measured from the axis of the screw, if the coefficient of friction between screw and nut is 0.12. | 4M |

**OR**

| | | | |
|---|---|---|---|
| **5** | | A ladder 5 meters long rests on a horizontal ground and leans against a smooth vertical wall at an angle 70° with the horizontal. The weight of the ladder is 900 N and acts at its middle. The ladder is at the point of sliding, when a man weighing 750N stands on a rung 1.5 meter from the bottom of the ladder. Calculate the coefficient of friction between the ladder and the floor. | 10 M |

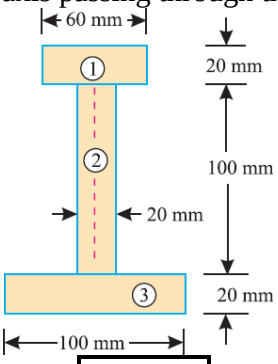
## UNIT-III

**6** A uniform lamina shown in Figure consists of a rectangle, a circle and a triangle. Determine the center of gravity of the lamina. All dimensions are in mm. 10 M




**OR**

**7** An I-section is made up of three rectangles as shown in Figure. Find the moment of inertia of the section about the horizontal axis passing through the center of gravity of the section. 10 M

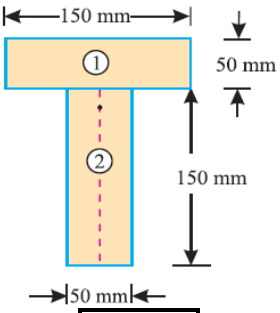



## UNIT-IV

**8** Derive an equation for moment of inertia of the following sections about centroidal axis: 10 M
a) A rectangular section
b) A triangular section from its base

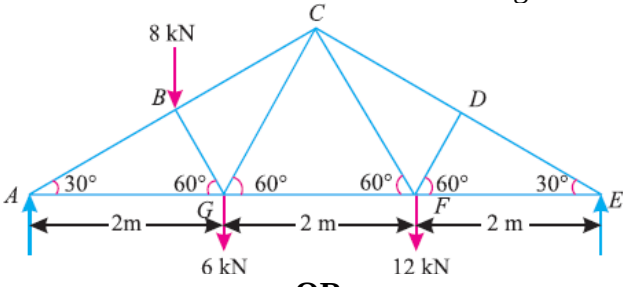
**OR**

**9** Find the moment of inertia of a T-section with flange as 150 mm × 50 mm and web as 150 mm × 50 mm about X-X and Y-Y axes through the center of gravity of the section as shown in figure. 10 M




## UNIT-V

**10** Analyze the members of a inclined truss loaded as shown in figure. 10M




**OR**

**11** Explain the procedure to find forces in members of truss by using method of sections. 10 M

***END***