

Roll No.

3073

**B. Tech 3rd Semester (ME)
Examination – December, 2019**

ENGINEERING MECHANICS

Paper : ESC-ME-209-G

Time : Three Hours]

[Maximum Marks : 75

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Question one is compulsory having six parts and each part is of 2.5 marks total of 15 marks and remaining questions is of 15 marks. And attempt one question from each Unit.

1. (a) Free body diagram

15

(b) What is Lami's theorem ?

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- (c) What is a Truss or Frame ? Explain with examples.
- (d) What is moment of inertia ?
- (e) What is rigid body ?
- (f) Define point of inflection.

UNIT - I

2. Forces of 20,30,40,50,60 and 70N act along the side AB, CB, CD, EF, and FA respectively of a angular hexagon ABCDEF whose side measure 10 cm. Make the calculations for the algebraic sum of moments of the forces about the centre of hexagon and one of the vertices. 15

3. (a) Explain the Static equilibrium. 7.5

(b) Discuss the triangle and parallel law of forces.

7.5

UNIT – II

4. Explain the steps involved while making an analysis of a simple truss by the method of joint and method of section. Explain with the help of suitable example of truss. 15
5. Find the M.O.I. of a plate with a circular hole about its centroidal x-axis. 15

UNIT – III

6. Determine the moment of inertia of I-section about the centroidal axis parallel to the flange. Top flange = 100 mm × 10 mm, Bottom Flange = 200 mm × 10 mm, Web = 100 mm × 10 mm. 15
7. A railway coach, having ordinary cross-seats, is travelling at 4m/s. A person runs at 5 m/s on the platform. In what direction, he must run so that he may enter the railway coach parallel to the seats? Also find the velocity with which he enters the coach. 15

UNIT – IV

8. Explain the linear and angular momentum equations. 15
9. A beam of span 8.0 m is rested over two simple supports at two ends. The beam is carrying U.D.L. of Intensity 2.0 KNm upto 4.0 m length from left end. A concentrated load of 5.0 KN at a distance of 6.0 m is applied on the beam. Draw S.F.D. and B.M.D. showing important values. Also find point of Contraflexure. 15