

JK Lakshmipat University, Jaipur
Institute of Engineering and Technology
End Term Examination-Backlog

B. Tech. 1st Semester /2011-2015



Course Name: Engineering Mechanics

Max Marks: 40

Course Code:

Time: 03.00 hr

- Note:** - 1. Question Paper has total three section in **which section A & C are compulsory.**
 2. Students have to attempt any six questions in total.
 3. Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
 4. Before answering the question, read it carefully.
 5. Mobile phones are strictly prohibited in the examination hall.

Section A

(10 Marks)

Q. No. 1 Define the followings:

(1×5 = 5 Marks)

- a) Angle of repose
- b) Free Body Diagram
- c) Radius of Gyration
- d) Virtual Work
- e) C.G.

Q. No. 2 Explain the law of Engineering Mechanics in details.

(5 Marks)

Section B

(20 Marks)

Q. No. 3 (a) Convert the quantities 300 lb×s and 52 slug/ft³ to appropriate SI units.

(2 Marks)

Q. No. 3 (b) The screw eye in Fig. 1 is subjected to two forces F_1 and F_2 . Determine the magnitude and direction of the resultant force.

(3 Marks)

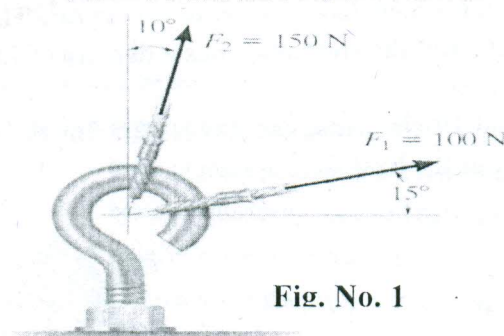


Fig. No. 1

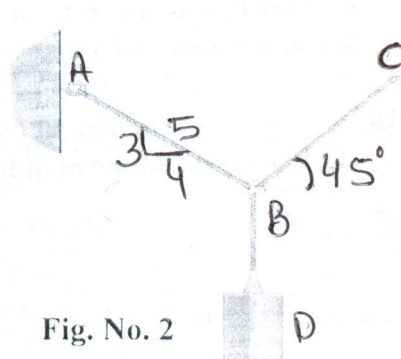


Fig. No. 2

Q. No. 4 (a) Determine the tension in the cables BA and BC necessary to support the 60 kg cylinder as shown in Fig. 2.

(3 Marks)

Q. No. 4 (b) Define Couple? Explain the various type of equivalent couple with the help of sketches.

(2 Marks)

BEST OF LUCK!

- Q. No. 5 Determine the force in each member of the truss in Fig. 3 and indicate if the members are in tension or compression. (5 Marks)

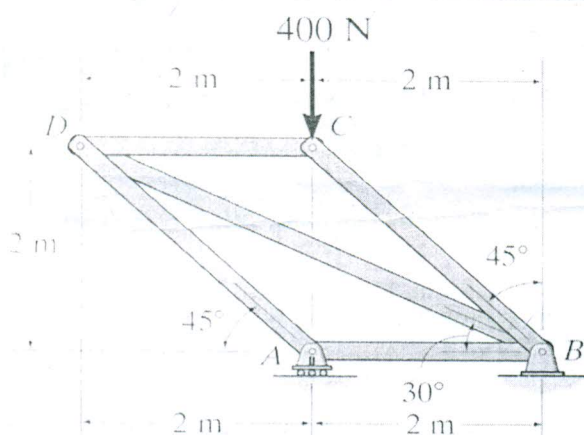


Fig. No. 3

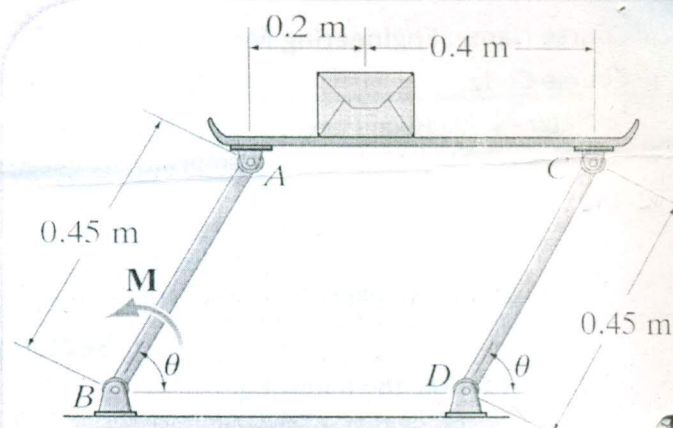


Fig. No. 4

- Q. No. 6 If the box as shown in Fig. 4 has a mass of 10 kg, determine the couple moment M needed to maintain equilibrium when $\theta = 60^\circ$. Neglect the mass of the members. (5 Marks)
- Q. No. 7 Derive the relation for reversibility condition of the Simple Lifting Machine & explain Law of Machine. (5 Marks)

Section C

(2×5 = 10 Marks)

- Q. No. 8 (a) Locate the center of mass of the bracket and shaft combination as shown in Fig. 5. The vertical face is made from sheet metal which has a mass of 25 kg/m^2 . The material of the horizontal base has a mass of 40 kg/m^2 , and the steel shaft has a density of 7.83 Mg/m^3 .
- Q. No. 8 (b) A beam of I-Section 50 cm deep and 19 cm wide, has flanges 2.5 cm thick and web 1.5 cm thick. Find the Moment of Inertia about the base.

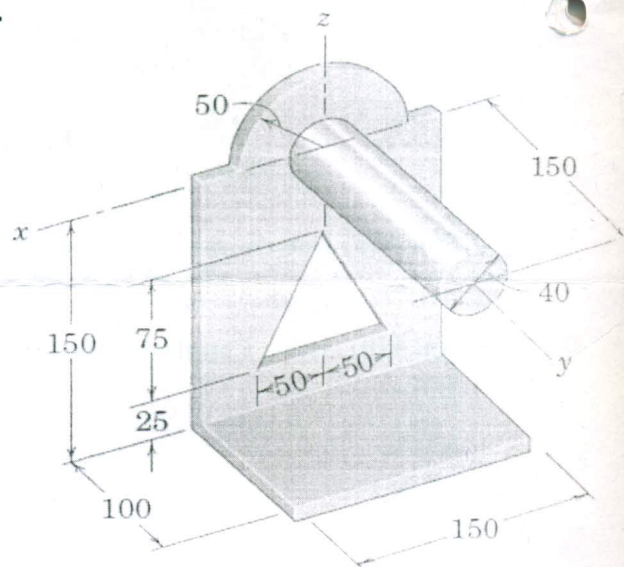


Fig. No. 5 Dimensions in millimeters

BEST OF LUCK!