

Reg. No. : 

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## Question Paper Code : 70146

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.

Third Semester

Civil Engineering

ME 3351 — ENGINEERING MECHANICS

(Common to B.E. Automobile Engineering/B.E. Industrial Engineering/  
B.E. Industrial Engineering and Management/B.E. Materials Science and  
Engineering/B.E. Mechanical Engineering/B.E. Mechanical Engineering  
(Sandwich)/B.E. Mechanical and Automation Engineering/B.E. Mechatronics  
Engineering/B.E. Production Engineering/B.E. Robotics and Automation/B.E. Safety  
and Fire Engineering)

(Regulations 2021)

Time : Three hours

Maximum : 100 marks

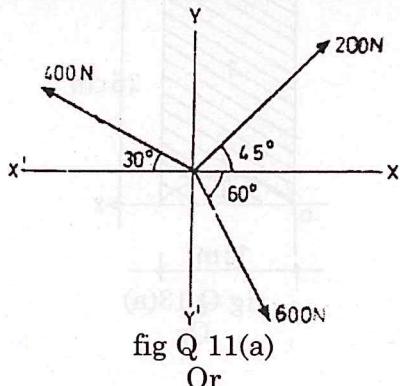
Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Resultant force.
2. What is meant by coplanar concurrent forces?
3. Write the principle of transmissibility.
4. State Varignon's theorem.
5. Write the theorem of pappus-Guldinus.
6. Recall Parallel axis theorem.
7. Define coefficient of friction.
8. Write any two laws of friction.
9. What is meant by coefficient of restitution?
10. State Impulse and Momentum principle.

PART B — (5 × 13 = 65 marks)

11. (a) Three coplanar forces are acting at a point as shown in fig Q 11(a). Determine the magnitude and the direction of the resultant force.



- (b) A block weighing 5kN is suspended from the ceiling by a chain. It is dragged aside by a horizontal chord until the chain makes  $60^\circ$  with the ceiling as shown in Fig Q.11(b). Find the tension in the chain and in the chord.

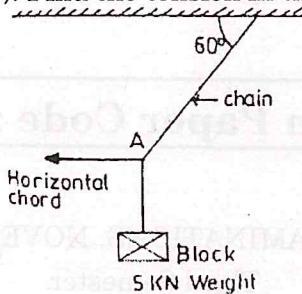


fig Q 11(b)

12. (a) Four forces of magnitude and direction acting on a square ABCD of side 2m are shown in fig Q 12(a). Calculate the resultant in magnitude and direction and also locate its point of application with respect to the sides AB and AD.

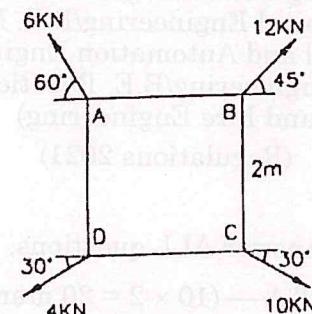


fig Q 12(a)

Or

- (b) Determine the support reactions of the beam shown in fig Q 12(b) below

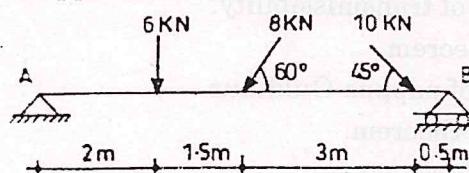


fig Q 12(b)

13. (a) Locate the center of gravity of a bullet, 1 cm diameter with a cone on the front and a hemisphere cut from the back as shown in fig Q 13(a) below. Assume the material to be homogeneous.

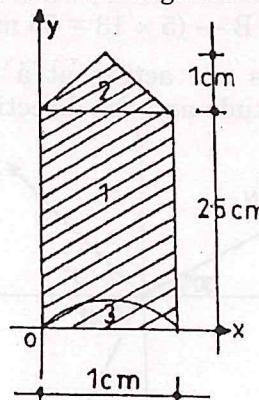


fig Q 13(a)

Or