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Question Paper Code : 41184

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Second Semester
Civil Engineering
GE 6253 – ENGINEERING MECHANICS

(Common to : Mechanical Engineering (Sandwich)/Aeronautical Engineering/
Agriculture Engineering/Automobile Engineering/Environmental Engineering/
Geoinformatics Engineering/Industrial Engineering/Industrial Engineering and
Management/Manufacturing Engineering/Marine Engineering/Materials Science
and Engineering/Mechanical Engineering/ Mechanical and Automation
Engineering/Mechatronics Engineering/Petrochemical Engineering/Production
Engineering/Robotics and Automation Engineering/Chemical Engineering/
Chemical and Electrochemical Engineering/Fashion Technology/Food Technology/
Handloom and Textile Technology/Petrochemical Technology/ Petroleum
Engineering/Pharmaceutical Technology/Plastic Technology/Polymer Technology/
Textile Chemistry/Textile Technology/Textile Technology (Fashion Technology)
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

(10×2=20 Marks)

1. State the different characteristics of a force.
2. State the conditions of equilibrium.
3. Differentiate simply supported beam, cantilever beam and fixed beam.
4. What are the different types of loads ?
5. Define centre of gravity .
6. State parallel axis theorem .
7. What is meant by angle of projection ?
8. What is meant by linear momentum ?
9. Give two examples of general plane motion.
10. What is meant by angle of repose ?

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PART - B

(5×16=80 Marks)

11. a) A tripod supports a load of 2kN as shown in Fig. 11 (a). The ends P, Q and R are in x-z plane. Find the forces in the three legs of the tripod. (16)

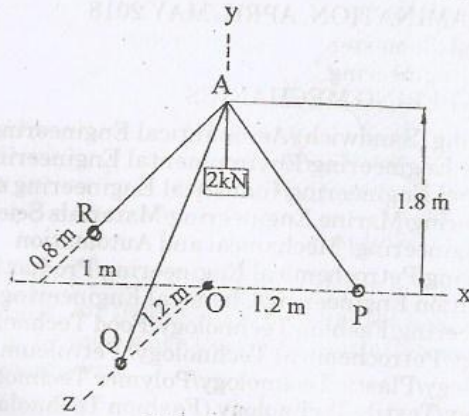


Fig. 11(a)

(OR)

- b) A weight of 8kN is suspended by means of three cables as shown in Fig. 11 (b). Determine the forces in the cables PA, PB and PC. (16)

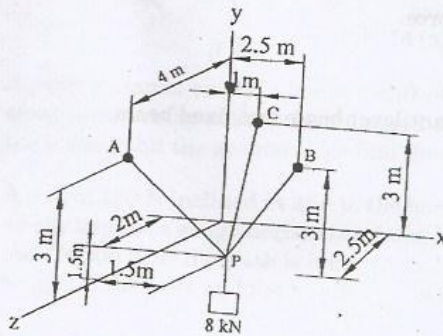


Fig. 11(b)



12. a) A simply supported beam is loaded as shown in Fig. 12(a). Find the reactions at P and Q. (16)

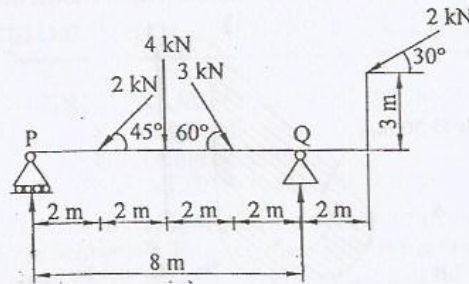


Fig. 12(a)

(OR)

- b) A channel of mass 800 kg is supported as shown in Fig. 12(b). Find the reactions at P and Q. (16)

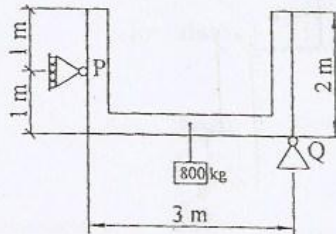


Fig. 12(b)

13. a) Locate the centroid of the shaded area shown in Fig. 13 (a). The dimensions are in 'mm'. (16)

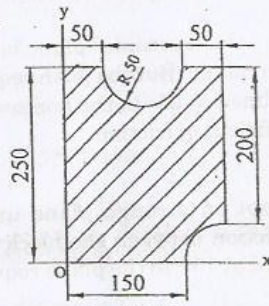


Fig. 13 (a)

(OR)

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- b) Find the moments of inertia of the hatched area shown in Fig. 13(b) about AA and BB. (16)

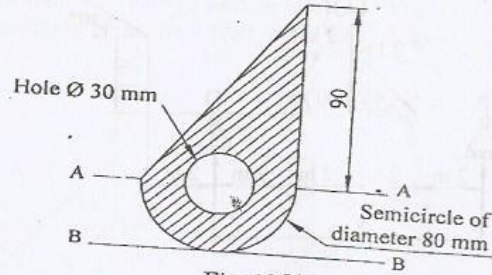


Fig. 13(b)

14. a) A block and pulley system is shown in Fig. 14(a). The horizontal plane and the pulley are frictionless. Determine the acceleration of the blocks and the tension in the cable when the system starts from rest. Use principle of impulse and momentum. (16)

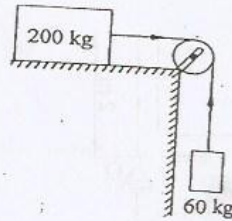


Fig. 14 (a)

(OR)

- b) A person stands on the edge of a cliff 500 m above the ground and throws a stone horizontally with an initial speed of 18 m/s. Determine the time taken by the stone to hit the ground. Also find the speed with which it hits the ground. (16)
15. a) A pull of 250 N inclined at 25° to the horizontal plane is required just to move a body kept on a rough horizontal plane. But the push required just to move the body is 300 N. If the push is inclined at 25° to the horizontal, find the weight of the body and the co-efficient of friction. (16)

(OR)

- b) A block weighing 1000 N is kept on a rough plane inclined at 40° to the horizontal. The coefficient of friction between the block and the plane is 0.4. Determine the least force inclined at 15° to the plane required just to move the block up the plane. (16)