

AU - 2482

Second Semester B. Tech. (FOPC) Polymer (Plastic) (CGS) Examination

ENGINEERING MECHANICS

Paper - 2 SCT 3

(USC - 11710)

P. Pages : 5

Time : Three Hours]

[Max. Marks : 80

- Note :** (1) Separate answer book must be used for each section in the subject Geology, Engineering material of Civil branch and separate answer book must be used for Section A and B in pharmacy and Cosmetic Tech.
- (2) Due credit will be given to neatness and adequate dimensions.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answer necessary with the help of neat sketches.

SECTION A

1. (a) Explain Resolution of forces. 4
- (b) Determine the resultant of the force system as shown in figure 1 (b).

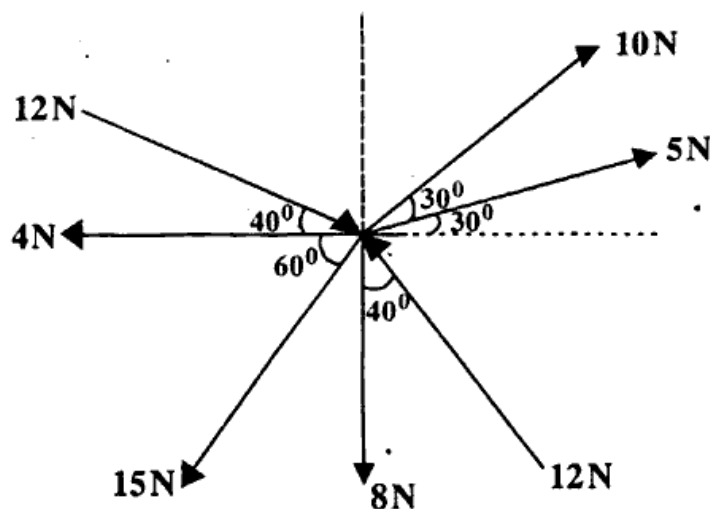


figure 1 (b)

OR

2. (a) State Varignon's Principle of moment. 4

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- (b) Determine the resultant of the force system as shown in figure 2 (b) and locate its position w. r. t. point A.

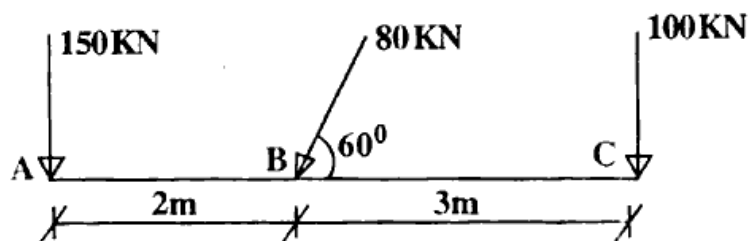


figure 2 (b)

9

3. (a) State the condition of equilibrium. 4
- (b) Two identical cylinder A and B each of weight 700 N are resting against vertical wall and smooth inclined as shown in figure 3 (b). Determine the reactions at each point of contact.

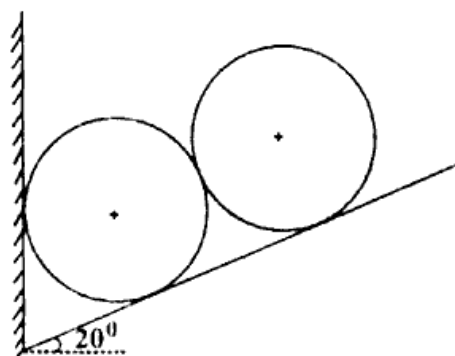


figure 3 (b)

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OR

4. (a) Explain parallel axis theorem. 3
- (b) Determine moment of inertia of plane Lamina about centroidal axis. Ref. fig. 4 (b).

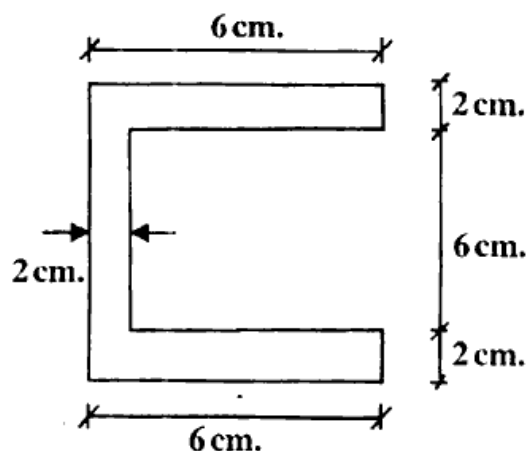
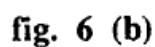


figure 4 (b)

10

6. (a) Define :—

- (b) A 1.20 m bar of negligible weight is resting on two rough inclines as shown in figure 6 (b) if angle of friction is 15° . Determine minimum distance 'x' at which force $Q = 250$ N may be applied before motion impends.



SECTION B

7. (a) An automobile 'A' starts from rest and accelerate at 3 m/sec^2 . Another automobile 'B' starts from same point, 6 seconds later, with zero initial velocity and accelerate at 6 m/sec^2 . Determine the time required by B to overtake 'A'. 7
- (b) An object is thrown vertically upward with a velocity of 30 m/sec . Four second later, a second object is projected in the same direction with a velocity of 40 m/s , obtained the time when two object will meet each other. 6

OR

8. (a) The acceleration of particle is given by $a = \frac{10}{V + 10}$ where a is m/sec^2 and V is m/sec . The particle start with zero initial velocity when $S = 0$, find position of particle when $V = 10 \text{ m/s}$. 7
- (b) A flywheel starts rotating from rest and given on acceleration of 1 rad/sec^2 . Find Angular velocity and speed in rpm after 1.50 minutes. 6
9. (a) State Kinetics equation for rectilinear motion. 3
- (b) Determine tension in each cord and acceleration of block A and B. Weight of block A and B are 1500 N and 500 N respectively. Assume pulleys to be smooth and frictionless. Ref. figure 9 (b).

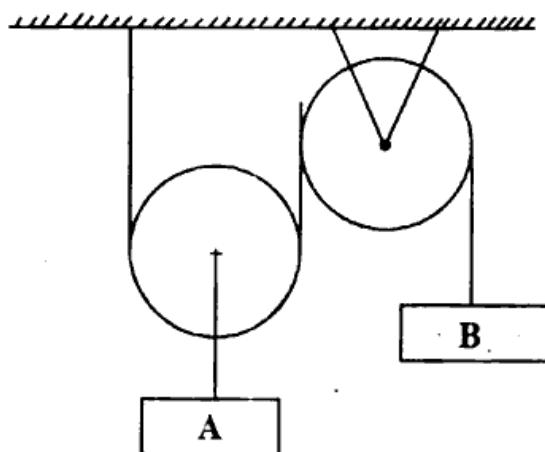


fig. 9 (b)

11

OR

10. (a) Define Work, Power, Energy. 3
- (b) Determine the constant force 'P' that will give the system of bodies shown in figure 10 (a), a velocity of 3 m/s after moving 4.5 m from rest.

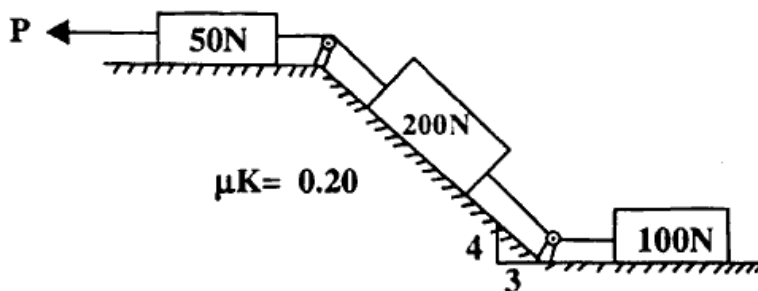


fig. 10 (b)

11

11. (a) Define Reversible and Irreversible machine. 4
- (b) A load of 20 kN is to be lifted by a differential wheel and axle. It consists of differential axle of 250 mm and 300 mm diameter and wheel diameter of 800 mm, find the effort required if the efficiency of machine is 55%. 9

OR

12. (a) Define mechanical Advantage, Velocity Ratio and efficiency of machine. 6
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- (b) A screw 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. 7

