**Code No. 14006**

# FACULTY OF ENGINEERING

## B. E. I Year (Backlog) Examination, March / April 2021

## Subject: Engineering Mechanics

**Time: 2 hours** **Max. Marks: 75**

**Note: Missing data, if any may be suitably assumed.**

### PART – A

**Answer any seven questions.** **(7 x 3 = 21 Marks)**

1. Explain concurrent and non concurrent forces with examples.
2. Explain the term “free body diagram’ with an example.
3. How dot product is applied to engineering mechanics. Explain briefly.
4. What are the different types of friction? Explain briefly.
5. How the term centroid differs from centre of gravity? Explain in detail.
6. State parallel axis theorem for area moment of inertia.
7. A stone is thrown vertically upwards and returns to earth in 3 sec. How high does it go?
8. State and explain D Alembert’s principle in detail.
9. A body wt 1000N moves on a level horizontal road for a distance of 400m. The resistance of the road is 10 m per 1000N wt of the body. Find the work done on the body by its resistance.
10. What do you mean by elastic impact. Explain briefly.

### PART – B

**Answer any three questions.** **(3 x 18 = 54 Marks)**

11. Three bars hinged at A and D, and pinned at B and C form a four link mechanism as shown in fig.1. Determine the value of P which will prevent motion.
12. A uniform ladder 7.2m long weighs 180N. It is placed against a vertical wall at an angle of 60˚ with the ground. How for along the ladder can a 700 N man climb before ladder is on the verge of slipping. The angle of friction at all contact surfaces is 15˚.
13. Derive the equations for M.I about X and Y axis for a right angled triangle.
14. The rectilinear motion of a particle is goverened by $a = -8S^{-2}$ where a is in $m/s^2$ and “S” is in m. where t = 1s, s=4m and v=2 m/s. Determine the acceleration of the particle at t=2 sec.

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15. A bullet weighing 0.5N and moving at 700m/s penetrates the 50N body shown in fig.2 and emerges with a velocity of 200m/s. How far and long does the body then move?

16. Determine the resultant of a system of concurrent forces having the following magnitude and passing through the origin and indicated points P=1400N (12,6,-4), T=2600N, (-3,-4,12), F=1350N (6,-3,-6).

17. The system fig.3 is connected by flexible inextensible cords. If the system starts from rest, find the distance d between A and the ground so that the system comes to rest with body B just touching A.



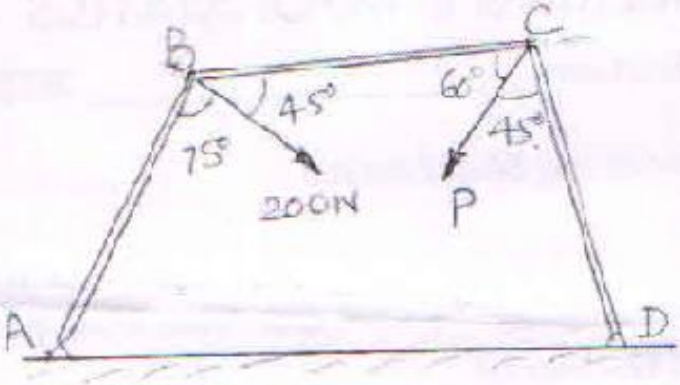


Fig .1

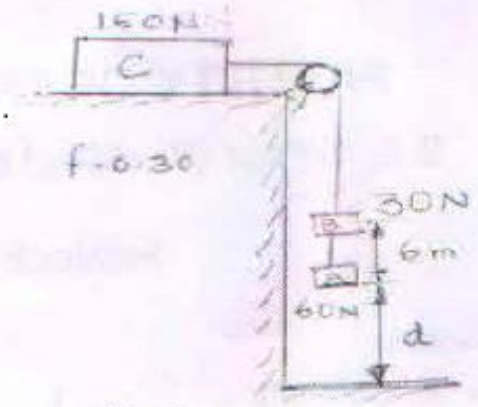


Fig .3

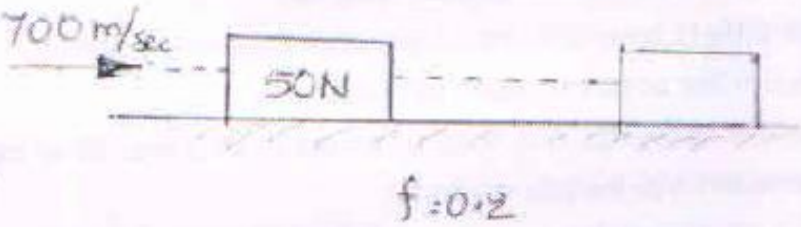


Fig .2

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