Roll No.						

Total No. of Pages : 03

Total No. of Questions : 09

## B.Tech. (Agriculture Engineering) (Sem.–1) ENGINEERING MECHANICS Subject Code : BTAG-106-22 M.Code : 92764 Date of Examination : 25-01-23

Time: 3 Hrs.

Max. Marks : 60

## INSTRUCTIONS TO CANDIDATES :

- 1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
- 2. SECTION B & C. have FOUR questions each.
- 3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
- 4. Select atleast TWO questions from SECTION B & C.

### SECTION-A

- I. Write short notes on :
  - a) State triangle law of forces.
  - b) State laws of friction.
  - c) Explain Vector quantities.
  - d) What are rigid bodies? Explain.
  - e) Define cone of friction.
  - f) Explain the principle of a linear momentum.
  - g) Define kinematics and dynamics.
  - h) Define Newton's  $2^{nd}$  law of motion.
  - i) Explain parallel axis theorem.
  - j) What do you mean by moment of a couple?

#### **SECTION-B**

- 2. Explain various force systems with neat sketches.
- 3. A body weighing 70kN rests in equilibrium on a rough plane whose slope is 300. The plane is raised to a slope of 450. What is the force applied to the body parallel to the plane that will support the body on the plane?
- 4. Find the moment of inertia of the following figure about the given XX axes.



5. A hollow cast iron column whose outside diameter is 200 mm has a thickness of 20 mm. It is 4.5 m long and is fixed at both ends. Calculate the safe load by Rankine-Gordon formula using a factor of safety of 4. Take permissible compressive stress as 550  $MN/m^2$  and constant a = 1/1600.

# **SECTION-C**

- 6. What do you understand by the term 'Couple'? Discuss the characteristics of a couple.
- 7. Two identical rollers, each of weight 100 N, are supported by an inclined plane and a vertical wall as shown in below Figure. Assuming smooth surfaces, find the reactions induced at the point of support A, B and C.



8. A truss is composed of members AB, BC, CD, and DA as shown in figure. A vertical load of 10 kN is applied at point D. Find the magnitude of force in the member BC.



9. What is the significance of stress-strain curve? Describe a stress-strain curve for tensile material.

**NOTE :** Disclosure of Identity by writing Mobile No. or Marking of passing request on any paper of Answer Sheet will lead to UMC against the Student.