

# JK LAKSHMIPAT UNIVERSITY, JAIPUR

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Backlog), November 2018

B. Tech in CSE, ME, CE, EE, ECE

Roll No.....

ME201: Engineering Mechanics

Time: 3 hours

Max. Marks: 100

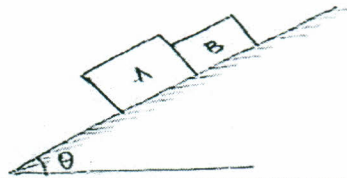
### Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

|      |                                                                                                                                                                                                                           |     |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| Q.1  | Short answer type questions (10 questions @ 2.5 marks)                                                                                                                                                                    | 25  |
| Q.1A | Explain the Lami's theorem.                                                                                                                                                                                               |     |
| Q.1B | Explain Newton's second law of motion with suitable example.                                                                                                                                                              |     |
| Q.1C | Explain the Principle of transmissibility.                                                                                                                                                                                |     |
| Q.1D | Discuss the angle of repose with suitable derivation.                                                                                                                                                                     |     |
| Q.1E | What is a truss? State the assumption for perfect Truss.                                                                                                                                                                  |     |
| Q.1F | Define the mechanical advantages followed by suitable expression.                                                                                                                                                         |     |
| Q.1G | Define the ideal effort followed by suitable expression.                                                                                                                                                                  |     |
| Q.1H | Define the ideal load followed by suitable expression.                                                                                                                                                                    |     |
| Q.1I | Define the law of machine followed by suitable expression.                                                                                                                                                                |     |
| Q.1J | Explain the triangle law of forces with the help of suitable example.                                                                                                                                                     |     |
| Q.2A | Locate the centroid of the T section.                                                                                                                                                                                     | 05  |
| Q.2B | Explain law of Parallelogram with neat sketch.                                                                                                                                                                            | 05  |
| Q.3A | Explain the method of Section for perfect truss.                                                                                                                                                                          | 05  |
| Q.3B | Differentiate between frame and truss? Explain the assumption involve in analysis of frame.                                                                                                                               | 2+3 |
| Q.4A | Explain the following terms with help of suitable example.<br>(a) Velocity of projection      (b) Angle of friction<br>(c) Trajectory                      (d) Time of flight                                             | 10  |
| Q.4B | The forces 30 N, 40 N, 50 N, 60 N and 70 N are acting at one of the angular points of a regular hexagon, towards the other five angular points, taken in order. Find the magnitude and direction of the resultant forces. | 10  |

Q.5A A projectile is aimed at a target on the horizontal plane and falls 12 m short when the angle of projection is  $15^\circ$  while it overshoots by 24 m when the angle is  $45^\circ$ . Find the angle of projection to hit the target. 10

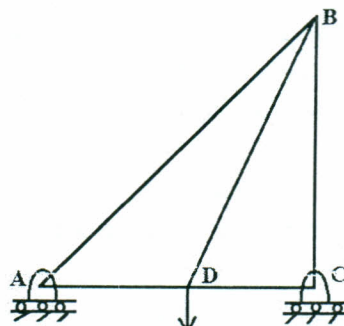
Q.5B Two blocks A & B weights 300 N and 200 N rest on a plane which is slowly raised from the horizontal position to an angle  $\theta$ . Find the maximum angle that can be reached before bodies slip down the incline. Assume  $\mu$  between block B & the plane is 0.25 and  $\mu$  between block A & the plane is 0.33 10



OR

Q.5B In a simple machine, whose velocity ratio is 30, a load of 2400 N is lifted by an effort of 150 N and a load of 3000 N is lifted by an effort of 180 N. Find the law of machine and calculate the load that could be lifted by a force of 200 N. Also calculate  
(a) The amount of effort wasted in overcoming the friction  
(b) Mechanical Advantage  
(c) The efficiency of machine 10

Q.6 Using the method of joints, determine the force in each member of the truss shown in figure. Indicate whether the members are in tension or compression. 15



OR

Q.6 Find the force at point  $F_{BC}$ ,  $F_{CE}$  and  $F_{EF}$  in the given figure. 15

