

Hall Ticket Number:

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Code No. : 13712

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (CBCS) III-Semester Main Examinations, December-2018

Bridge Course: Mechanics for Engineers
 (Civil, EEE & Mech. Engg.)

Time: 3 hours

Max. Marks: 50

Note: Answer ALL questions in Part-A and any FIVE from Part-B

| S.No. | Stem of the question | M | L | CO | PO |
|----------------------------------|---|---|---|----|----|
| Part-A (5 × 2 = 10 Marks) | | | | | |
| 1. | The horizontal component of a force which is 30° with the horizontal is 250N, find the magnitude of the force also its component along vertical? | 2 | 1 | 1 | 1 |
| 2. | Write the application of simple systems in friction. | 2 | 1 | 2 | 1 |
| 3. | A stone is dropped from a tower of height H, hits the ground with 25mps, what should be height of the tower, also find the time taken by the stone for hitting the ground? | 2 | 2 | 3 | 1 |
| 4. | Define the instantaneous centre. Show that at this point velocity is zero. | 2 | 2 | 4 | 2 |
| 5. | A pulley is connected by two different weights of the blocks, W1 and W2 (W1 > W2), find the acceleration of the blocks. | 2 | 2 | 5 | 2 |
| Part-B (5 × 8 = 40 Marks) | | | | | |
| 6. a) | A tripod is connected by three cables AB, CB and DB, the spatial coordinates of the points are A(2,3,4), B(4,6,8), C(1,5,8) and D(-3,6,-8), find the magnitude of the limiting weight placed on the tripod. | 4 | 1 | 1 | 1 |
| b) | A flat plate is subject to the coplanar system of forces shown in Fig 1. The inscribed grid with each square having a length of 1cm locates each force and its slope. Determine the resultant and its x & y intercepts. | 4 | 2 | 1 | 1 |
| | | | | | |
| 7. a) | Explain the laws of friction. | 3 | 1 | 1 | 1 |
| b) | A rod, 12m long and of negligible weight is supported and carries the horizontal and vertical loads shown in Fig 2, The co-efficient of friction for all contacts surfaces is 0.3. If T=300N, determine the value of 'P' to start motion downwards. The position of T is 3m from A along the rod, the position of P is 8m from A along the rod. | 5 | 2 | 2 | 1 |
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| 8. a) | Differentiate the rectilinear motion and curvilinear motion and write the governing equations in both cases. | 3 | 1 | 1 | 1 |
| b) | A flight is moving horizontally from an altitude of 3KM from the ground at a speed of 500KMPH, a particle is dropped from the flight , find the horizontally distance travelled by the particle also find the velocity of the particle while hitting the ground with the direction. | 5 | 1 | 1 | 2 |
| 9. a) | Distinguish between the plane motion and circular motion, what is the importance of instantaneous centre in the kinetics of the rigid body. | 3 | 2 | 2 | 1 |
| b) | A simply supported beam of span 10m has self-weight 10kN/m, if the roller support is suddenly removed, find the magnitude of the reaction at hinge support for the horizontal position of the beam, and also find the angular acceleration of the beam. | 5 | 2 | 2 | 2 |
| 10. a) | Mention the principle and applications of the work-energy theorem. | 3 | 3 | 2 | 2 |
| b) | A 125 kg concrete block is released from the rest in the position shown in fig 3, and pulls a 200kg long up at 30° with the ramp, if the co-efficient of kinetic friction is 0.5, find the velocity of the block while hits the ground at B. (use work-energy principle) | 5 | 3 | 3 | 2 |
| | | | | | |
| Fig 3 | | | | | |
| 11. a) | Write the application of law of transmissibility. | 3 | 1 | 3 | 2 |
| b) | A tripod is connected by three cables AB, CB and DB, the spatial co-ordinates of the points are A(2,5,4),B(4,8,8),C(2,5,8) and D(-3,-6,-8), find the magnitude of the limiting weight placed on the tripod. If the limiting force on any leg of the tripod is 200N only. | 5 | 2 | 3 | 2 |
| 12. | Answer any <i>two</i> of the following: | | | | |
| a) | A stone is dropped into a well of depth H, and hears a sound wave after 2.8 sec find the depth of well also velocity of stone while hitting the water. Take velocity of sound is 330mps. | 4 | 2 | 2 | 2 |
| b) | A circular disc of weight 200N has in pure rotation, what should the tangential force required if it has angular acceleration 45 rad/sec^2 , take radius of the disc is 3m. | 4 | 2 | 2 | 2 |
| c) | A weight of $W=300\text{N}$ is dropped from a height 10m, and hits a spring has stiffness 400N/m, find the deformation of the spring. | 4 | 2 | 2 | 2 |

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

| S. No. | Criteria for questions | Percentage |
|--------|--|------------|
| 1 | Fundamental knowledge (Level-1 & 2) | 60% |
| 2 | Knowledge on application and analysis (Level-3 & 4) | 35% |
| 3 | *Critical thinking and ability to design (Level-5 & 6) (*wherever applicable) | 05% |