

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Marks Scored:

Level : B.Arch.

Year : II

Exam Roll No. :

Time: 30 mins.

Course : CIEG 231

Semester : I

F. M. : 10

Registration No.:

Date : 08 APR 2025

SECTION "A"

[20Q. \times 0.5 = 10 marks]

Choose and encircle the most appropriate answer.

- The moment of inertia of a body does not depend upon
 - The angular velocity of the body.
 - Mass of the body.
 - The distribution of mass in the body.
 - The axis of rotation of the body.
- The angular acceleration α of a rotating body is defined as:
 - The rate of change of angular velocity.
 - The rate of change of torque.
 - The product of moment of inertia and angular velocity.
 - The rate of change of displacement.
- What is a free-body diagram?
 - It's a sketch of a moving body that shows the internal forces of the body and reaction forces.
 - It's a sketch of an undisturbed body that shows the external forces of the body.
 - It's a sketch of an isolated body that shows external forces of the body, and reaction forces.
 - It's a sketch of a body in motion that shows the bending forces of the body.
- What is the relationship between each force, if three concurrent forces act on a body according to Lami's theorem?
 - Directly proportional to the sine of the angle between the other two forces.
 - Inversely proportional to the cosine of the angle between the other two forces.
 - Directly proportional to the cosine of the angle between the other two forces.
 - Inversely proportional to the sine of the angle between the other two forces.
- Which of the following is a vector quantity?
 - Density
 - Mass
 - Volume
 - Acceleration
- The parallel axis theorem gives the moment of inertia _____ to the surface of consideration.
 - Linear
 - Non-Linear
 - Perpendicular
 - Parallel
- Which factor does not influence the center of gravity of an irregularly shaped object?
 - Shape
 - Density
 - Mass distribution
 - Color

KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2025

Level : B.Arch.
Year : II
Time : 2 hrs. 30mins.

08 APR 2025

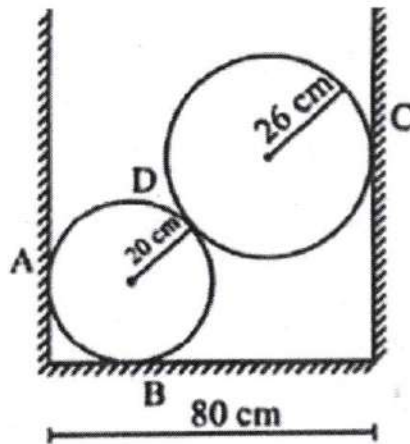
Course : CIEG 231
Semester : I
F. M. : 40

SECTION "B"

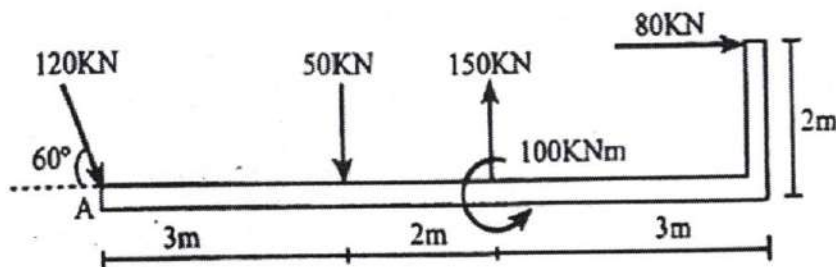
Attempt *ALL* questions. Assume suitable data if necessary.

1. State Varignon's Theorem. [2]

2. Two homogenous spherical balls rest between two vertical walls as shown in the figure. The radius of a larger ball is 26 cm and its weight is 40N. The distance between the walls is 80 cm. The radius of the smaller ball is 20 cm and its weight is 25N. Assuming the contact surface to be smooth, determine the reaction forces at all contact points. [5]



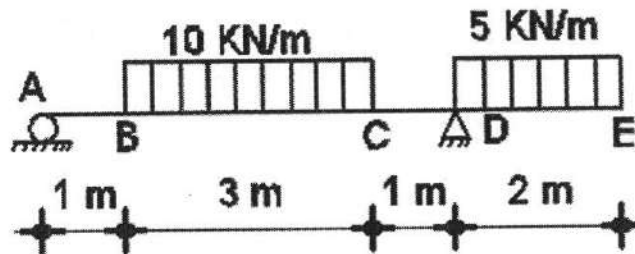
3. Determine the magnitude, direction, and position of the resultant of the system of forces with respect to point A as shown in the figure below: [5]



4. Determine the centroid of the quarter-circle by integration method. [7]

P.T.O.

5. Draw the shear force and bending moment diagram of the given beam shown below: [7]



6. A car is traveling down a slopping road represented by the curve $x^2 = 300y$, where x and y are in m, when the car is 12m above the ground, its velocity is 60 Km/hr. and decelerating at the rate of 2 m/s^2 . Determine the total acceleration at this instant. [7]
7. Two blocks A and B having respective weights of 500N and 1000N start from rest. The pulley is frictionless and practically massless. The kinematic coefficient of friction between block A and the inclined surface is 0.35. Determine the acceleration of each block and tension in the cord. [7]

