

KATHMANDU UNIVERSITY
End Semester Examination [C]
June, 2018

Level : B. E.
Year : II

Course : CIEG 203
Semester : I
F. M. : 10

Exam Roll No. :

Time: 30 mins.

Registration No.:

Date JUN 12 2018

SECTION "A"

[20 Q × 0.5 = 10 marks]

Choose the most appropriate answer.

- A structure is said to be in tension when
 - subjected to two equal and opposite forces and member tends to elongate
 - subjected to two unequal forces in same direction and member does not to elongate
 - subjected to two equal and opposite forces and member tends to compress
 - subjected to two unequal forces in the same direction and member tends to elongate
- Coplaner non-concurrent forces defined as
 - All forces lie in the same plane but their line of action passes through a single point
 - All forces lie in the same plane but their line of action do not pass through a single point
 - All forces lie in the different plane but their line of action do not pass through a single point
 - All forces lie in the same plane but their line of action passes through different plane
- Moment of a force about a point is measured by
 - The product of force and the perpendicular distance of the line of action
 - The sum of force and the perpendicular distance of the line of action
 - The sum of the force and the parallel distance of the line of action
 - The product of forces and the parallel distance of the line of action
- Roller supports are
 - frictionless and provide a reaction at right angles to the roller base
 - frictionless and provide a reaction parallel to the roller base
 - frictionless and provide reactions in both parallel and right angle to the roller base
 - which provides friction and fixed
- The shear force at the ends of a simply supported beam with uniformly distributed load w/meter and length l is
 - wl
 - $wl/2$
 - Zero
 - $wl^2/8$
- The algebraic sum of the moments of a coplanar force system is equal to the moment of the resultant about the same moment centre is
 - Varignon's theorem
 - law of resolution
 - Newton's law
 - D' Alembert theory
- Support provides both horizontal and vertical reactions
 - Roller
 - Hinge
 - Fixed
 - combination of hinge and roller
- The resultant of the two forces (each with a magnitude of $Q/2$) acting at a right angle is
 - $Q/2$
 - $Q/\sqrt{2}$
 - $\sqrt{3} Q$
 - $\sqrt{2} Q$

9. The point through which resultant of the gravitational force acts for any orientation of the body
- Centre of mass
 - Centre of gravity
 - Centre of area of mass
 - Centre of earth
10. Centroid applies for
- Bodies with mass and weight
 - Plane figure have area only but no mass
 - Plane figures have mass and weight
 - Plane figures have mass and area
11. For the statically determinant beam, the bending moment at the roller support
- minimum
 - maximum
 - constant
 - Zero
14. The displacement of a body in a rotation is called
- Angular displacement
 - Angular acceleration
 - Linear displacement
 - Linear acceleration
15. Angular displacement can be measured in
- Meter
 - Newton
 - radians
 - kilogram
16. In one revolution, the angular displacement of body is
- 160 degree
 - 260 degree
 - 460 degree
 - 360 degree
17. The angular acceleration of a body is defined as
- The rate of change of time with respect to angular velocity of a body
 - The rate of change of linear velocity of a body with respect to time
 - The rate of change of angular velocity of a body with respect to time
 - The rate of change of linear acceleration of a body with respect to time
18. Moment of inertia of a triangular section base (b) and height (h) about an centroid
- $bh^3/4$
 - $b^3h/12$
 - $b^3h/16$
 - $b^3h/36$
19. The radius of gyration of a lamina is the
- ratio of its moment of inertia to its area
 - Square root of the ratio of its area to its moment of inertia
 - Square root of the ratio of its moment of inertia to its area
 - ratio of its area to its moment of inertia
20. In simply supported beam loaded with uniformly distributed load, the maximum bending moment occurs
- At the mid span of the beam
 - At the hinge support only
 - At the roller support only
 - Throughout the beam

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

Course : CIEG 203
Semester : I
F. M. : 40

SECTION "B"

Attempt ALL questions.

1. Draw Shear Force Diagram and Bending Moment Diagram for the beam shown in Figure 1. [10]
2. Determine the member forces of the given truss shown in Figure 2. Also State the nature of forces. (Show the results in tabular form). Draw clearly free body diagrams for each joints. [8]
3. Locate the centroid of the thin plate shown in Figure 3. [4]
4. What do you mean by general plane motion of the rigid body? Illustrate with examples. Two blocks shown in Figure 4 start from rest. The pulleys are frictionless and having no mass. The kinetic coefficient of friction between the block A and the inclined plane is 0.4. Determine the acceleration of each block and tension in each chord. Use principle of linear impulse momentum. [3+6]
5. What do you mean by work energy principle? Illustrate the application of application of principle of work and energy .A 10 kg package drops from a chute into a 25 kg cart with a velocity of 3 m/s shown in Figure 5. Knowing that the cart is initially at rest and may roll freely, determine (a) the final velocity of the cart, (b) the impulse exerted by the cart on the package, (c) the fraction of the initial energy lost in the impact. [3+6]

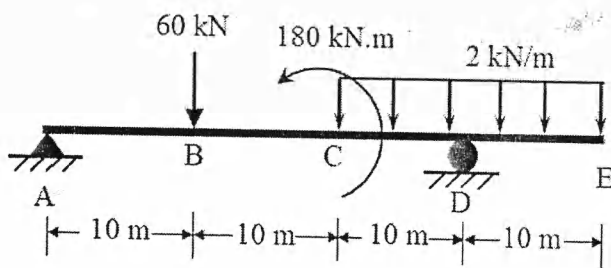


Figure 1

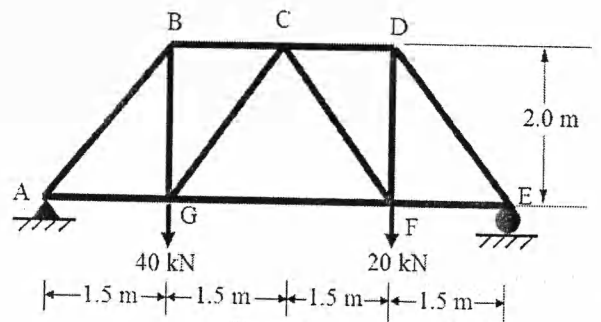


Figure 2

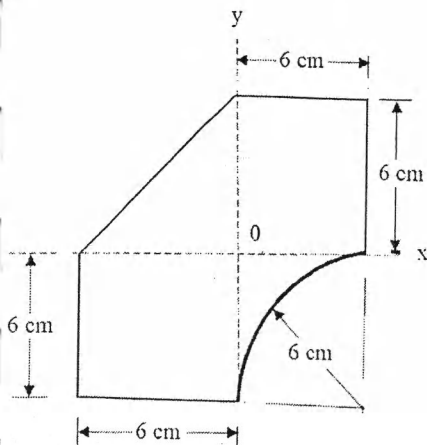


Figure 3

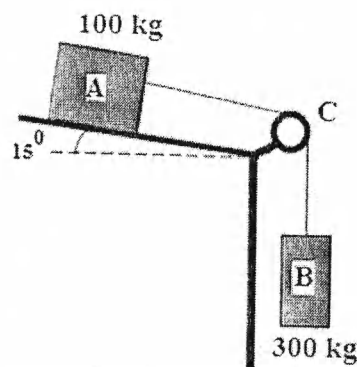


Figure 4

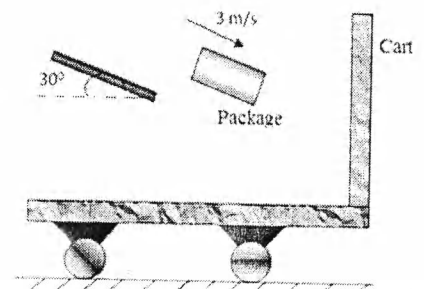


Figure 5

