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Term End Examination 2023-2024

Programme – Dip.CSE-2020/Dip.CSE-2022/Dip.EE-2022/Dip.CE-2022/Diploma in
Robotics & Automation-2023/Dip.CE-2023/Dip.CSE-2023/Dip.EE-2023/Dip.ME-2023

Course Name – Engineering Mechanics

Course Code - DCSE105/ES102

(Semester I)

Full Marks : 60

Time : 2:30 Hours

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :
 - (i) Select the unit of force in S.I.
 - a) Kilogram
 - b) Newton
 - c) Watt
 - d) Dyne
 - (ii) Select the correct example for cantilever beam from the following.
 - a) Portico slabs
 - b) Roof slabs
 - c) Bridges
 - d) Railway sleepers
 - (iii) If the angle of friction is zero, determine the amount of friction which will be experienced by the body.
 - a) Zero friction
 - b) Infinite friction
 - c) The force of friction will act normal to the plane
 - d) The force of friction will act in the direction of motion
 - (iv) Select from the following options which is not a type of wheel and axle.
 - a) Screw
 - b) Gear
 - c) Bicycle wheel
 - d) Hammerhead
 - (v) Identify the direction of forces for equilibrium in free body diagram
 - a) vertically Upward
 - b) vertically Downward
 - c) horizontally Right
 - d) horizontally Left
 - (vi) Determine the radius of gyration of a circular plate of diameter 10 cm.
 - a) 1.5cm
 - b) 2.0cm
 - c) 2.5cm
 - d) 3.5 cm
 - (vii) Select the correct option from the following.
 - a) Moving train is an example of point load.
 - b) Moving train is an example of cantered load.
 - c) Moving train is an example of UDL load.
 - d) Moving train is an example of rolling load.

(viii) Identify the position of centroid and center of mass when a material has no uniform density throughout the body.

- a) identical
- b) not identical
- c) independent upon the density
- d) unpredictable

(ix) Identify from the following options which is not a vector quantity

- a) weight
- b) velocity
- c) acceleration
- d) speed

(x) The ratio of limiting friction and normal reaction is defined as

- a) coefficient of friction
- b) angle of friction
- c) angle of repose
- d) sliding friction

(xi) Identify the following is not the unit of distance.

- a) angstrom
- b) light year
- c) micron
- d) milestone

(xii) Identify the following do not have identical dimensions.

- a) Momentum and impulse
- b) Torque and energy
- c) Torque and work
- d) Moment of a force and angular momentum

(xiii) Choose the correct option about the working principle of simple machine from the following

- a) couple
- b) moment
- c) lever
- d) moment of inertia

(xiv) The phenomena of horizontal pull and push is defined as

- a) Theory of relativity
- b) Theory of friction
- c) Theory of forces
- d) Theory of action

(xv) Null Vector is defined as

- a) Negative Vector
- b) Unit Vector
- c) Free Vector
- d) Zero Vector

Group-B

(Short Answer Type Questions)

3 x 5=15

2. Explain the formula of center of gravity for semicircle and hemisphere (3)
3. Define couple. Write the names of the different couple. (3)
4. Define moment of force. Deduce it mathematically. (3)
5. Distinguish between differential wheel and axle. (3)
6. Distinguish between angle of friction and cone of friction. (3)

OR

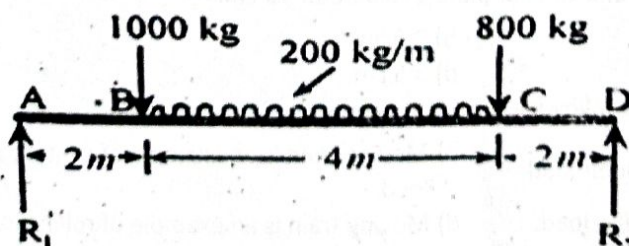
Explain three laws of friction. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

7. Explain the rolling resistance. (5)
8. Determine the reaction of simply supported beam when a point load of 1000kg & 800kg along with a uniformly distributed load of 200kg/m is acting on it. (5)



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- 9. Define the term 'parallel forces'. Discuss their classification. (5)
- 10. Explain the following statement with proper justification that the double tracker bus is more unstable. (5)
- 11. Measure the centroid of an unequal angle section $100\text{ mm} \times 80\text{ mm} \times 20\text{ mm}$. (5)

- 12. Define friction, and explain its affect on the motion of objects in various environments. (5)

OR

Illustrate the following statement with proper justification, "We slip when we step on a banana peel." (5)

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