UNITY TRAINING
ACADEMY FOR DDCET

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Practice Set 4 Solution

Classical MECHANICS

Topics : Circular motion, angular velocity, angular acceleration, centripetal and centrifugal force, Work, energy, kinetic energy, potential energy, power.

DDCET final exam weightage of this topic : 3 Questions (6 Marks)

Total Practice sets of this topic :	8 (sets) x 25 (questions) = 200 Questions
Total Practice tests of this topic :	2 (exams) x 30 (questions) = 60 Questions
Offline / Online during lecture :	4 (lectures) X 50 (Questions) = 200 Question

DDCET 2025

Total 460 Questions to practice this topic

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Section 1 :

Circular motion, angular velocity, angular acceleration, centripetal and centrifugal force, Work, energy, kinetic energy, potential energy, power.

1. In uniform circular motion, which quantity remains constant?

A) Velocity
B) Acceleration
C) Speed ✓
D) Angular acceleration

2. The SI unit of angular velocity is:

A) rad/s ✓
B) m/s
C) m/s^2
D) Hz

3. Centripetal force always acts:

A) Outwards from the center
B) Along the tangent
C) Perpendicular to the radius
D) Towards the center ✓

4. Angular acceleration is defined as:

A) Rate of change of linear velocity
B) Rate of change of angular velocity ✓
C) Angular displacement
D) Rotational inertia

5. A body moving in a circle with constant speed has:

A) Zero velocity
B) Zero acceleration
C) Changing velocity ✓
D) Changing speed

6. Which of the following quantities is a vector?

A) Angular displacement
B) Angular velocity ✓
C) Angular speed
D) Centripetal force

7. The direction of angular velocity is given by:

A) Newton's law
B) Right-hand thumb rule ✓
C) Left-hand rule
D) Lenz's law

8. A satellite moves in circular orbit due to:

A) Centrifugal force
B) Gravity acting as centripetal force ✓
C) Inertia
D) Thrust

9. Angular velocity (ω) is related to linear velocity (v) as:

A) $\omega = v/r$ ✓
B) $v = r\omega^2$
C) $v = \omega r^2$
D) $\omega = r/v$

10. If the radius of the circular path is doubled while the linear speed remains constant, the centripetal force will:

A) Double
B) Halve ✓
C) Quadrupled
D) Remain the same

11. What provides centripetal force in a car turning on a circular path?

A) Engine
B) Gravity
C) Friction between tires and road ✓
D) Air resistance

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12. Which of these increases with increase in radius for same angular speed?

A) Angular velocity
B) Centripetal force
C) Linear speed ✓
D) Angular acceleration

13. Work is said to be done when:

A) Force is applied
B) Displacement occurs
C) Both force and displacement occur in same direction ✓
D) None of these

14. Which energy is possessed by a moving object?

A) Potential energy
B) Thermal energy
C) Kinetic energy ✓
D) Electrical energy

15. Power is defined as:

A) Work done × time
B) Work done / time ✓
C) Force × displacement
D) Energy × time

16. Gravitational potential energy depends on:

A) Height only
B) Mass only
C) Mass and height ✓
D) Speed

17. The energy stored in an object due to its position is:

A) Kinetic
B) Potential ✓
C) Thermal
D) Chemical

18. If velocity is doubled, kinetic energy becomes:

A) Same
B) Double
C) Four times ✓
D) Half

19. Which is not a form of mechanical energy?

A) Potential
B) Kinetic
C) Thermal ✓
D) Both a and b

20. Work done against gravity is stored as:

A) Kinetic energy
B) Elastic energy
C) Potential energy ✓
D) Thermal energy

21. What is the power of a machine that does 100 J of work in 2 seconds?

A) 100 W
B) 50 W ✓
C) 200 W
D) 25 W

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22. Negative work is done when:

A) Force and displacement are in same direction
B) Force and displacement are in opposite directions ✓
C) No force is applied
D) Displacement is zero

23. If no energy is lost, total mechanical energy is:

A) Increased
B) Decreased
C) Constant ✓
D) Zero

24. Centripetal force is:

A) A real force acting outward on a rotating object
B) A fictitious force acting outward on a rotating object
C) A real force acting inward towards the center of the circular path ✓
D) A fictitious force acting inward towards the center of the circular path

25. Centrifugal force is often described as:

A) A real force
B) A reaction force to centripetal force (Newton's Third Law pair)
C) A fictitious force experienced in a rotating frame of reference ✓
D) The force responsible for circular motion