11105

No. of Printed Pages: 4

Register Number | | | | | | | |

11

REVISION EXAMINATION

PART – III
PHYSICS

Time Allowed : 3.00 Hours] [Maximum Marks : 70

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

PART – I

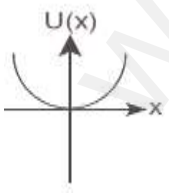
Note : (i) Answer **all** the questions. **15x1=15**
(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

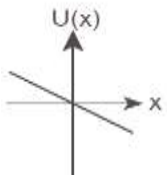
1. An air column in a pipe which is closed at one end, will be in resonance with the vibrating body of frequency 83Hz. Then the length of the air column is
(a) 1.5 m (b) 0.5 m (c) 1.0 m (d) 2.0 m

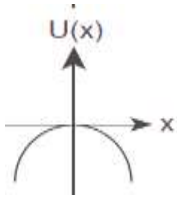
2. A couple produces,
(a) pure rotation (b) pure translation
(c) rotation and translation (d) no motion

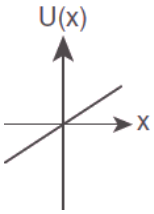
3. A particle executing SHM crosses points A and B with the same velocity. Having taken 3 s in passing from A to B, it returns to B after another 3 s. The time period is
(a) 15 s (b) 6 s (c) 12 s (d) 9 s

4. A particle is placed at the origin and a force $F = kx$ is acting on it (where *k* is a positive constant). If U(0) = 0 , the graph of U *(x)* versus x will be (where U is the potential energy function)

(a) 

(b) 

(c) 

(d) 

5. Two identically sized rooms A and B are connected by an open door. If the room A is air conditioned such that its temperature is 4 °C lesser than room B, which room has more air in it?
(a) Room A (b) Room B
(c) Both room has same air (d) Cannot be determined

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6. Which of the following pairs of physical quantities have not same dimension?
   (a) force and power (b) torque and energy
   (c) Work and energy (d) Surface tension and surface energy
7. The efficiency of diesel engines is maximum up to
   (a) 30% (b) 44% (c) 70% (d) 55%
8. Two objects of masses m_1 and m_2 fall from the heights h_1 and h_2 respectively. The ratio of the magnitude of their momenta when they hit the ground is
   (a) $\sqrt{\frac{h_1}{h_2}}$ (b) $\sqrt{\frac{m_1 h_1}{m_2 h_2}}$ (c) $\frac{m_1}{m_2}\sqrt{\frac{h_1}{h_2}}$ (d) $\frac{m_1}{m_2}$
9. In an isochoric process, we have
   (a) W = 0 (b) Q = 0 (c) ΔU = 0 (d) ΔT = 0
10. Which of the following represents a wave?
   (a) $\frac{1}{x+vt}$ (b) six(x+vt) (c) $(x-vt)^3$ (d) x(x+vt)
11. Force acting on the particle moving with constant speed is
   (a) always zero (b) need not be zero
   (c) always non zero (d) cannot be concluded
12. For a triatomic molecule (non-linear type) Degree of freedom, f is
   (a) 3 (b) 6 (c) 5 (d) None of these
13. Which of the following is not a scalar?
   (a) viscosity (b) surface tension (c) pressure (d) stress
14. If the masses of the Earth and Sun suddenly double, the gravitational force between them will
   (a) remain the same (b) increase 2 times
   (c) increase 4 times (d) decrease 2 times
15. When the food is cooked in an open vessel. This process is
   (a) isothermal (b) adiabatic (c) isobaric (d) isochoric

PART – II

Note : Answer **any six** questions. Question No. **24** is **compulsory.** 6x2=12

16. Check the correctness of the equation ½ mv^2 = mgh using dimensional analysis.
17. What is projectile? Give two examples.
18. State Newton's Second Law of motion.
19. Write the differences between elastic and inelastic collisions.
20. What is P-V diagram?
21. Give any two examples of torque in day-to- day life.
22. What are geostationary satellites?
23. Define Poisson's ratio.
24. If a flute sounds a note with 450Hz, what are the frequencies of the second and third harmonics of this pitch? If the clarinet sounds with a same note as 450Hz, then what are the frequencies of the lowest two harmonics produced?

PART – III

Note : Answer **any six** questions. Question No**. 33** is **compulsory.** 6x3=18

25. Write characteristics of progressive waves.
26. What are the various types of friction? Suggest few methods to reduce friction.
27. What do you mean by the term weightlessness? Explain the state of weightlessness of a freely falling body.
28. Write any three applications of Surface Tension.
29. Explain the principle of moments.
30. What are the limitations of dimensional analysis?
31. Calculate the energy consumed in electrical units when a 75 W fan is used for 8 hours daily for one month (30 days).
32. Write the salient features of Static and Kinetic friction.
33. During a cyclic process, a heat engine absorbs 500 J of heat from a hot reservoir, does work and ejects an amount of heat 300 J into the surroundings (cold reservoir). Calculate the efficiency of the heat engine?

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PART – IV

Note : Answer **all** the questions. 5x5=25

34. State and explain work energy principle. Mention any three examples for it.

(OR)

Derive the work done in an adiabatic process.

35. Describe the method of measuring angle of repose.

(OR)

Derive Poiseuille's formula for the volume of a liquid flowing per second through a pipe under streamlined flow.

36. i) Write a note on triangulation method to measure larger distances.

ii) A RADAR signal is beamed towards a planet and its echo is received 6 minutes later. If the distance between the planet and the Earth is 6×10^{10} m. Calculate the speed of the signal?

(OR)

Describe Newton's formula for velocity of sound waves in air and also discuss the Laplace's correction.

37. Explain in detail the triangle law of addition.

(OR)

Derive an expression for escape speed.

38. Derive the expression for mean free path of the gas.

(OR)

Derive the expression for moment of inertia of a rod about its centre and perpendicular to the rod.

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