MR. physics

11

PHYSICS PUBLIC MODEL EXAM- MARCH -18

STD: XI   **Marks: 70**

DATE: 14.02.2018   **TIME: 2:30** HRS

PART – I

I. ANSWER ALL THE QUESTIONS   15 X 1 = 15

1. Red light has a wavelength of 7000 Å. In µm it is
   (a) 0.7 µm   (b) 7 µm   (c) 70 µm   (d) 0.07 µm

2. An athlete running in a race will continue to run even after reaching the finishing point. It is due to inertia of ….
   a) rest   b) motion   c) direction   d) both b) and c)

3. The angle of inclination of the resultant when two vectors act in the same direction is …..
   a) 270^0 b) 180^0 c) 90^0 d) 0^0

4. For a person holding dumbbell in his hands and sitting on a turn table, if he pulls his hands suddenly towards his chest, the speed of rotation ……
   a). increase   b) decrease   c) remains same   d) becomes zero

5. Time taken by the polar satellite to travel from pole to pole is …..
   a). 102 days   b) 102 hours   c) 102 minutes   d) 102 seconds

6. The unit of gravitational field intensity is …………
   a)   N kg   b)   N m kg^{-1} c)   N m   d)   N kg^{-1}

7. Reynold's number for streamlined motion ………
   a) is greater than 3000   b) lies between 2000 to 3000
   c) lies between 0 to 2000   d) is less than 0

8. The frequency of oscillation of free oscillation depends on……..
   a) inertial factor only   b) spring factor only   c) both a) and b)   d) None of the above

9. In the formation of stationary waves, at antinode the resultant amplitude is ….
   a) Zero   b) maximum   c) minimum   d) varies between maximum and minimum

10. The experimental value of velocity of sound in air 332 m s^{-1}.   Theoretical value of velocity of sound in air is 280 ms^{-1} by what percentage is the theoretical value less than the experimental value ….
    a). 15 % b) 20 %   c) 25 %   d) 30 %

11. If the Earth stops rotating, the value of g at the equator will
    (a) increase   (b) decrease   (c) remain same   (d) become zero

12. Two wires of the same radii and material have their lengths in the ratio 1 : 2. If these are stretched by the same force, the strains produced in the two wires will be in the ratio
    (a) 1 : 4   (b) 1 : 2   (c) 2 : 1   (d) 1 : 1

13. Numbers of beats produced by two waves of Y_1= sin 2000 πt, Y_2 = a sin 2008πt is …
    a). 0   b) 1   c) 4   d) 8

14. At – 273° C, the kinetic energy of the molecule is…..
    a) Zero   b) Very high   c) Very low   d) varying between maximum and minimum

15. The critical angle for crown glass is …….
    a) 37.31^0 b) 24.41^0 c) 48.75^0 d) 41.14^0

PART II

II. Answer any 6 questions in which question no.23 is compulsory.   6 X 2 = 12

16. A goldsmith put a ruby in a box weighing 1.2 kg. Find the total mass of the box and ruby applying principle of significant figures. The mass of the ruby is 5.42 g.

17.   **(a)** A stone is dropped from the window of a train moving along a horizontal straight track, the path of the stone as observed by an observer on ground is………………………

(b) Inertia of a body has direct dependence on………………..

(c) When three forces acting at a point are in equilibrium……………….

(b) A particle moves along a circular path under the action of a force. The work done by the force is………..

18. State the law of conservation of angular momentum.

19. State Geo-centric theory.

20. What will happen to the orbiting satellite, if its velocity varies?

21. Determine the velocity for air flowing through a tube of 10^{-2} m radius. For air $\rho = 1.3$ kg m^{-3} and Reynolds number is 2000 and $\eta = 187 \times 10^{-7}$ N s m^{-2}.

22. On what factors the natural frequency of a body depend on?

23. A wave of length 0.60 cm is produced in air and travels with a velocity of 340 m s-1. Will it be audiable to human ear?

24. (a) A beaker full of hot water is kept in a room. If it cools from 80ºC to 75ºC in t_1 minutes, from 75ºC to 70ºC in t_2 minutes and from 70ºC in t_3 ………………………..**(write the condition of t_1 , t_2 and t_3)**

   (b) For an ant moving on the horizontal surface, the number of degrees of freedom of the ant will be:…………………

PART III

III. Answer any 6 questions in which question no.29 is compulsory   6 X 3 = 18

25. A horse pulling a cart exerts a steady horizontal pull of 300 N and walks at the rate of 4.5 kmph. How much work is done by the horse in 5 minutes?

26. What are the Conditions for life on any planet?

27. Explain the three moduli of elasticity.

28. Write any advantage and disadvantage of Resonance.

29. Sounds of different frequencies propagation through same medium. Will the wave velocity vary? Why?

30. What is Irreversible process? *Give example.*

31. What is Solar constant?

32. What is meant by an optical fibre? State its principle.

33. Write any three Properties of diamagnetic and what are use of ferromagnetic materials?

PART IV

IV. ANSWER ALL THE QUESTIONS   5 X 5 = 25

34.   **O**btain by dimensional analysis an expression for the surface tension of a liquid rising in a capillary tube. Assume that the surface tension T depends on mass m of the liquid, pressure P of the liquid and radius r of the capillary tube (Take the constant k = 1/2).

OR

Prove that Motion of a projectile projected at an angle with the horizontal (oblique projection) the path of a projectile is Parabola .

35.   Obtain an expression for position of centre of mass of a two particle system.

OR

The acceleration due to gravity varies with (i) altitude and (ii) depth. Prove.

36.   Explain Total energy of a liquid.

OR

Derive the differential formula for SHM.

37.   A railway engine and a car are moving parallel but in opposite direction with velocities 144 km/hr and 72 km/hr respectively. The frequency of engine's whistle is 500 Hz and the velocity of sound is 340 m s^{-1}. Calculate the frequency of sound heard in the car when

(i) the car and engine are approaching each other   (ii) both are moving away from each other.

OR

Describe the construction and working of a pyrheliometer.

38.   Derive lens maker's formula for a thin biconvex lens.

OR

A short bar magnet of magnetic moment 5.25×10^{-2} A m^2 is placed with its axis perpendicular to the Earth's field direction. At what distance from the centre of the magnet on (i) its equatorial line and (ii) its axial line, is the resultant field inclined at 45° with the Earth's field. Magnitude of the Earth's field at the place is 0.42×10^{-4} T.

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