



Padalsalai's Telegram Groups!

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Centum Question
Paper
- 2020

Model Exam - 2019

XI - PHYSICS
LESSON [1, 2, 3, 4, 5]

Total Marks : 70M

1x15=15M

Section - A

I Answer all the questions

- ① The density of a material in cgs system of units is 4 g cm^{-3} . In a system of units in which unit of length is 10 cm and unit of mass is 100g, then the value of density of material will be

a) 0.04 b) 0.4 c) 40 d) 400

- ② The velocity of a particle v at an instant t is given by $v = at + bt^2$. The dimensions of b is

a) $[L]$ b) $[LT^{-1}]$ c) $[LT^{-2}]$ d) $[LT^{-3}]$

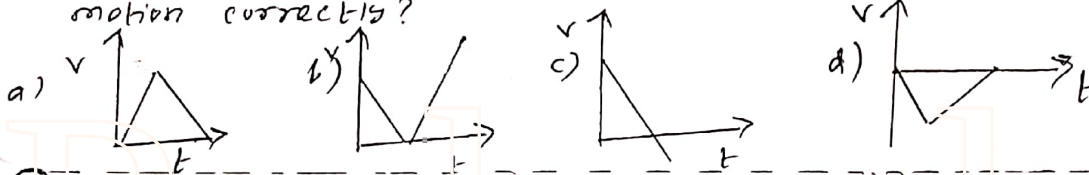
- ③ $2.65 \times 10^{24} \text{ m}$ the number of significant figures

a) 0 b) 1 c) 2 d) 3

- ④ If a particle has negative velocity and negative acceleration, its speed

a) Increase b) decreases c) remain same d) zero

- ⑤ A ball is projected vertically upwards with a velocity v . It comes back to ground in time t . which $v-t$ graph shows the motion correctly?



- ⑥ The unit of angular velocity is

a) rad b) rad s^{-1} c) rad s^{-2} d) all the above

- ⑦ If a person moving from pole to equator, the centrifugal force acting on him

a) Increase b) decrease c) remains same d) a and b

- ⑧ 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.

- ⑨ Apply Newton's second law for an object at rest on Earth and analyse the result is

a) $N = mg$ b) $N = -mg$ c) both a and b d) none of the above

- ⑩ If the linear momentum of the object is increased by 0.1%, then the kinetic energy is increased by

a) 0.1% b) 0.2% c) 0.4% d) 0.01%

- ⑪ The work done by the conservative force for a closed path is

a) negative b) zero c) positive d) not defined

- ⑫ Power dimensional formula

a) $[ML^2T^{-3}]$ b) $[ML^2T^{-2}]$ c) $[ML^{-2}T^{-1}]$ d) $[ML^{-1}T^{-2}]$

- ⑬ A particle is moving with a constant velocity along a line parallel to positive x axis. The magnitude of its angular momentum with respect to the origin is

a) zero b) Increasing x c) decreasing x d) constant

- 14) The ratio of the acceleration for a solid sphere (mass m and radius R) rolling down an incline of angle θ without slipping and slipping down the incline without rolling is

a) 5:7 b) 2:3 c) 2:5 d) 7:5

- 15) Locate the center of mass of a uniform rod of mass (M) and length (L)

a) $x_{cm} = 2L$ b) $x_{cm} = L/2$ c) $x_{cm} = \frac{3L}{2}$ d) $x_{cm} = L/2$

$b \times 2 = 12 \text{ m}$

Section-B

II Two mark question. compulsory question no: 17

- 16) How will you measure the diameter of the Moon using parallax method?

- 17) How do you deduce that two vectors are perpendicular?

- 18) It is possible to measure the depth of a well using kinematic equations?

- 19) Under what condition will a car skid on a leveled circular road?

- 20) Explain various types of friction suggest a few methods to reduce friction

- 21) Define (i) power (ii) Law of conservation of Energy

- 22) Show that the ratio of velocities of equal masses in an Inelastic collision when one of the masses is stationary is $\frac{v_1}{v_2} = \frac{1-e}{1+e}$

- 23) Give any two examples of torque in day-to-day life.

- 24) A particle of mass (m) is moving with constant velocity (v). Show that its angular momentum about any point remains constant throughout the motion.

Section-C

III Three mark question. compulsory question 27 $b \times 3 = 18 \text{ m}$

- 25) (i) $\frac{1}{2}mv^2 = mgh$ using dimensional correct (or) Incorrect?

- (ii) The radius of the circle is 3.12 m calculate the area of the circle with regard to significant figures.

- 26) Define (i) Displacement with unit
(ii) velocity with unit
(iii) Acceleration with unit

(17)

- (i) Explain what is meant by Cartesian Co-ordinate system?
 (ii) Convert the vector $\vec{r} = 3\hat{i} + 2\hat{j}$ into a unit vector?

(28)

Explain the concept of inertia. Write two examples each for inertia of motion, inertia of rest and inertia of direction.

(29)

- (i) What is the meaning by pseudo force?
 (ii) Calculate the centrifugal force experienced by a man of 60 kg standing at Chennai?
 (Given: Latitude of Chennai is 13°)

(30)

- (i) Relation between momentum and kinetic energy
 (ii) Calculate the energy consumed in electrical units when a 75W fan is used for 8 hours daily for one month (30 days)

(31)

- (i) Write the various types of potential energy. Explain the formulae.
 (ii) Derive loss of kinetic energy in elastic collision.

(32)

- Define
 (i) center of mass
 (ii) couple
 (iii) center of gravity.

(33)

- (i) Difference between sliding and slipping?
 (ii) How do you distinguish between stable equilibrium and unstable equilibrium?

section-D.

IV Answer all the questions

$$5 \times 5 = 25 \text{ M}$$

- 34) a) (i) Define error
 (ii) Different types of error [No Explain]
 (iii) Explain the propagation of errors in addition and multiplication
 (or)

b) Derive the equation of motion, range and maximum height reached by the particle thrown at an oblique angle (θ), with respect to the horizontal direction

(35) a) ii) state triangle law of addition
 iii) Derive the expression for total acceleration in the non uniform circular motion
 (or)

b) ci) using free body diagram, show that it is easy to pull an object than to push it
 (ii) Explain the motion of blocks connected by a string in vertical motion.

(36) a) ci) state Lami's Theorem
 (ii) Difference between centripetal and centrifugal force
 (or)

b) Arrive at an expression for elastic collision in 1 dimension and discuss various cases.

(37) a) (i) Explain with graphs the difference between work done by a constant force and by a variable forces
 (ii) state and Explain work energy principle. Mention any three examples for it
 (or)

b) (i) state conservation of angular momentum
 (ii) Discuss conservation of angular momentum with examples

(38) a) (i) Difference between translational motion and rotational motion
 (ii) Different types of Equilibrium [No Explain]
 (or)

b) Explain
 (i) Triangulation method
 (ii) RADAR method
 (iii) Rounding off.

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Question
Paper
2020.

Model Exam - 2019

XI - physics

Person [6, 7, 8, 9, 10, 11]

Total mark :- 70M

1x15 = 15M

Section - A

I. Answer all the question.

① The work done by the sun's gravitational force on the Earth is

- a) zero b) positive c) negative d) b and c

② If the distance between the Earth and Sun were to be doubled from its present value, the number of days in a year would be

- a) 64.5 b) 1032 c) 182.5

③ Which of the following is not a scalar?

- a) viscosity b) surface tension
c) pressure d) stress

④ For a given material, the rigidity modulus is $(\frac{1}{3})^{th}$ of Young's modulus. Its Poisson's ratio is

- a) 0 b) 0.25 c) 0.3 d) 0.5

⑤ The efficiency of a heat engine working between the freezing point and boiling point of water is

- a) 6.25% b) 20% c) 26.8% d) 12.5%

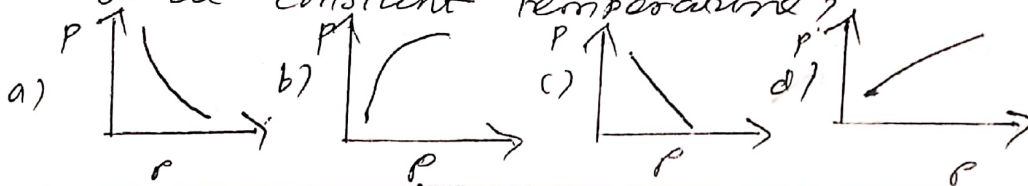
⑥ The graph between volume and temperature in Charles's law is

- a) an ellipse b) a circle c) a straight line
d) a parabola

⑦ Which of the following gases will have least rms speed at a given temperature?

- a) Hydrogen b) Nitrogen c) oxygen d) carbon dioxide

⑧ Which of the following shows the correct relationship between the pressure and density of an ideal gas at constant temperature?



⑨ The damping force on an oscillator is directly proportional to the velocity. The units of the constant of proportionality are

- a) kg ms^{-1} b) kg ms^{-2} c) kg s^{-1} d) kg s

⑩ In a simple harmonic oscillation, the acceleration against displacement for one complete oscillation will be

- a) an ellipse b) a circle
c) a parabola d) a straight line.

(11) which of the following represents a wave
 a) $(x-vt)^3$ b) $x(x+vt)$ c) $\frac{1}{(x+vt)}$ d) $\sin(x+vt)$

(12) A sound wave whose frequency is 500 Hz travels in air and then hits the water surface. The ratio of its wavelengths in water and air is
 a) 4.30 b) 0.23 c) 5.30 d) 1.23

(13) Reynold numbers are $Re < 1000$ is
 a) streamline b) turbulent c) unsteady d) none of the above

(14) The SI unit for specific heat capacity is
 a) $J kg^{-1} K^{-1}$ b) J/kg c) $J kg^{-2} K^{-2}$ d) J/kg^2

(15) $\sin \omega t + \cos \omega t$ represent is
 a) periodic b) non periodic c) a and b
 d) none of the above

Section - B.

6x2=12 M

II two mark questions (compulsory question no (17))

(16) Will the angular momentum of a planet be conserved? Justify your answer. 187

(17) Which one of these is more elastic, steel (or) rubber? Why? 229

(18) "An object contains more heat" - is it a right statement? If not why?

(19) Why moon has no atmosphere?

(20) State the laws of simple pendulum? 348

(21) Sketch the function $y = 2 + a$ & explain your sketch. 386

(22) A refrigerator has COP of 3. How much work must be supplied to the refrigerator in order to remove 200 J of heat from its interior? 151

(23) Write down the kinetic energy and total energy expressions in terms of linear momentum, for one dimensional case. 212

(24) The sound level from a musical instrument playing is 50 dB. If three identical musical instruments are played together then compute the total intensity. The intensity of the sound from each instrument is $10^{-12} \text{ W m}^{-2}$. 264

Section - C

Three mark questions compulsory no (27)

- (i) why is there no lunar eclipse and solar eclipse every month? 188
- (ii) How will you prove that Earth itself is spinning? 189
- (b) state (i) pascal law (ii) Archimedes principle 230
- (c) (i) state the second law of Thermodynamics in terms of Entropy 278
- (ii) what is black body? 273
- (38) write the expression for rms speed, average speed and most probable speed of a gas molecule.
- (39) (i) write short notes on two springs connected in series
- (ii) write short notes on two springs connected in parallel
- (30) comparison between progressive waves and stationary waves
- (31) (i) compute the distance between anti-node and neighbouring node
- (ii) what is meant by end correction in resonance air column apparatus?
- (32) (i) Any three comparison between simple Harmonic motion and angular harmonic motion
- (ii) classify the following motions as periodic and non-periodic motions
- a) motion of Halley's comet
 - b) motion of clouds
 - c) moon revolving around the Earth
- (33) draw the TP diagram (p-x axis, T-y axis), VT (T-x axis, V-y axis) diagram for
- a) Isochoric process
 - b) Isothermal process
 - c) isobaric process.

Section - D

5x5=25 M.

IV Five mark questions

- 34) a) (i) state law of period. give formula
- (ii) Explain how Newton arrived at his law of gravitation from Kepler's Third law
- (or)
- b) Explain the different types of Moduli: Elasticity.

35) a) state and prove Bernoulli's Theorem for a flow of incompressible, non-viscous and streamlined flow of fluid
(08)

b) Derive the work done in an adiabatic process

36) a) Explain in detail Newton's law of cooling
(08)

b) (i) write down the postulates of kinetic theory of gases

(ii) Describe the Brownian motion.

37) a) (i) describe the total degrees of freedom for monoatomic molecule, diatomic molecule, triatomic molecule

(ii) Derive the expression for mean free path of the gas
(08)

b) (i) Discuss the simple pendulum in detail
(ii) Explain in detail the four different types of oscillations

38) a) (i) what is meant by angular harmonic oscillation? compute the time period of angular harmonic oscillation

(ii) write short notes on the oscillations in simple harmonic motion, liquid column in tube.
(08)

b) Explain how overtones are produced in a
a) closed organ pipe
b) open organ pipe.

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