THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

Date: 14-12-2022 GRADE: XII	Model Examination (2022-23) PHYSICS	Max marks: 70 Time: 3 Hours

General Instructions:

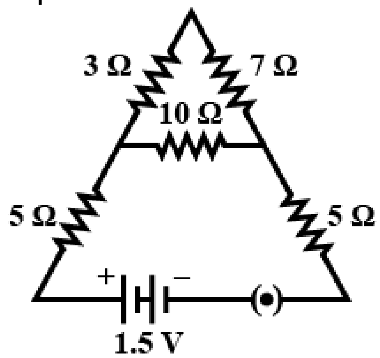
1. There are 35 questions in the question paper. All questions are compulsory.

Qn No		**Marks**
I	**Choose the correct option**	**(15×1= 15)**
1	If the sizes of charged bodies are very small compared to the distances between them, we treat them as ______________. (A) zero charges (B) point charges (C) single charge (D) no charges	1
2	The electric potential inside a conducting sphere _______________ (A) is zero (B) increases from centre to the surface (C) decreases from centre to the surface (D) remains constant from the centre to the surface	1
3	The resistivity of certain metals or alloys drops to zero when they are cooled below a certain temperature, this phenomenon is known as ____________. (A) conductivity (B) partial conductivity (C) superconductivity (D) non-conductivity	1
4	Magnetic field at any point inside the straight solenoid is given as ________________ (A) $\mu_0 + nI$ (B) μ_0+n+I (C) μ_0/nI (D) $\mu_0 nI$	1
5	Susceptibility is positive for (A) Ferromagnetic material (B) Paramagnetic material (C) Diamagnetic material (D) Option (A) and (B)	1

6	Which of the following waves have a maximum frequency? (A) Infrared wave (B) gamma rays (C) micro wave (D) radio waves	1
7	A boy starts from a point A, travels to a point B at a distance of 1.5 km and returns to A. If he takes one hour to do so, his average velocity is (A) 3 km/h (B) zero (C) 1.5 km/h (D) 2 km/h	1
8	Which one of the following is the unit of velocity? (A) kg/s (B) m/kg (C) m/s (D) m/s^2	1
9	A body moves on a circular distance of radius R. Starting from a point A he moves to a point B which is on the other end of the diameter AB. The ratio of the distance travelled to the displacement made by him is (A) $\pi/2$ (B) π (C) 2π (D) 4π	1
10	A body starts from rest and travels with an acceleration of 2 m/s^2. After t seconds its velocity is 10 m/s. Then t is (A) 10 s (B) 5 s (C) 20 s (D) 6 s	1
11	A body is traveling in a circle at constant speed. It (A) has an inward acceleration (B) has constant velocity. (C) has no acceleration (D) has an outward radial acceleration	1
12	The path followed by a projectile is called its (A) Territory (B) Treasury (C) Tractor (D) Trajectory	1
13	When an external force is not applied to the system, its total momentum ______ (A)Becomes zero (B)Remains constant (C)Increases gradually (D)Decreases gradually	1
14	A passenger in a moving bus is thrown forward when the bus is suddenly stopped. This is explained (A) by Newtons first law (B) by Newtons second law (C) by Newtons third law (D) by the principle of conservation of momentum	1
15	body of mass 5 kg is travelling with a uniform velocity of 2 m/s. Its momentum is (A) 10 kg m/s (B) 7 kg m/s (C) 2 .5 kg m/s (D) 3 kg m/s	1

II	**Assertion and Reason** Two statements are given – one labelled Assertion (A) and the other labelled Reason (R). Choose the correct option from the following	**(3×1=3)**
16	**ASSERTION(A):** Voltmeter is connected in parallel with the circuit. **REASON(R):** Resistance of a voltmeter is very large. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true and R is NOT the correct explanation of A (C) A is true but R is false (D) A is false and R is also false	1
17	**ASSERTION(A):** Faraday's laws are consequence of conservation of energy. **REASON(R):** In a purely resistive ac circuit, the current legs behind the emf in phase. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true and R is NOT the correct explanation of A (C) A is true but R is false (D) A is false and R is also false	1
18	**ASSERTION(A):** A body is momentarily at rest when it reverses the direction. **REASON(R):** A body cannot have acceleration if its velocity is zero at a given instant of time. (A) Both A and R are true and R is the correct explanation of A (B) Both A and R are true and R is NOT the correct explanation of A (C) A is true but R is false (D) A is false and R is also false	1
III	**Very short answer questions**	**(7×2=14)**
19	Draw the electric lines of force surrounding the charges if a) a '+ q' charge and a '- q' charge is separated at a distance 'a' apart in air. b) Two '- q' charges are placed at a distance 'a' apart in air.	2
20	Two-point charges A and B of values $+5\times10^{-9}$ C and $+3\times10^{-9}$ C are kept 6cm apart in air. Calculate the work done when charge B is moved by 1 cm towards the charge A.	2
21	A straight-line conductor of length 0.4 m is moved with a speed of 7 m/s perpendicular to a magnetic field of intensity 0.9 Wb/m^2. Find the induced emf across the conductor.	2

22	The magnetic field of a plane electromagnetic wave is given by $B=2\times10^{-7}\sin(0.5\times10^{3}x+1.5\times10^{11}t)$. what is the wavelength and frequency?	2
23	What are vector quantities? List the names of any two types of vectors.	2
24	State Newton's first and second laws of motion.	2
25	Differentiate between static friction and kinetic friction	2
IV	**Short answer questions**	**(5×3=15)**
26	Capacitors are considered to be the building blocks of all integrated circuits. A parallel plate capacitor is a simple form of a capacitor. a) Write down the expression for the capacity of a parallel plate air capacitor in terms of plate area and their separation. b) Raju found that capacity of a parallel plate air capacitor is 10mF. Find the capacity of it when he immersed the unit completely in a medium of dielectric constant 2.5. c) Obtain expression for the energy stored in a capacitor.	3
27	a) State the working principle of a moving coil galvanometer. b) A galvanometer coil has a resistance of 12 ohms. It shows a full-scale deflection for a current of 3 mA. How will you convert this into a voltmeter of range 0-18V?	3
28	(A) State parallelogram law of vector addition (B) Derive the equation of resultant vector with the help of a suitable diagram	3
29	A javelin is projected at an angle of 30^0 with an in initial velocity of 5 m/s from the ground. What are its velocity and acceleration at the highest point?	3
30	A person firing a bullet from the gun experiences a backward jerk. (A) Explain the principle behind this. (B) A bullet of mass 15 g fired with a velocity of 100 m/s from a gun of mass 2 kg. Find the recoil speed of the gun.	3
V	**Long answer questions**	**(3×5=15)**

31	(A) Certain materials do not obey Ohm's law. Explain the deviations of Ohm's law in metals and semiconductors with the help of suitable graphs. (B) Derive the equation of the balanced state in a Wheatstone bridge using Kirchhoff's laws. **OR** (A) State the two Kirchhoff's rules used in the analysis of electric circuits and explain them. (B) Find the equivalent resistance of the following circuit 	5
32	Draw a sketch of the basic elements of an a.c. generator. State its principle and briefly explain its working.	5
33	(a) A person looking at a mesh of crossed wires is able to see the vertical lines more distinctly than the horizontal wires. What is the effect due to? How is such a defect of vision corrected? (b) A man with normal near point (25cm) reads a book with small print using a magnifying glass: a thin convex lens of focal length 5cm. (i) What is the closest and the farthest distance at which he can read the book when viewing through the magnifying glass? (ii) What is the maximum and minimum angular magnificent (magnifying power) possible using the above simple microscope?	
VI	**Case study**	**(2×4=8)**

Read the following paragraph and answer the questions

34 Power (P) of a lens is given as the reciprocal of focal length (P=1/f) where f should be in meter and P is in Diopter . for convex power is positive and concave power is –ve. When two or more lenses are kept in contact then power of the combined lens is given as P= P1 + P2+P3 …….

(i) Magnetization of a sample is

(a) Volume of sample per unit magnetic moment
(b) Net magnetic moment per unit volume
(c) Ratio of magnetic moment and pole strength
(d) Ratio of pole strength to magnetic moment

(ii) Identify the wrongly matched quantity and unit pair.

(a) Pole strength	Am
(b) Magnetic susceptibility	dimensionless number
(c) Intensity of magnetisation	A m^{-I}
(d) Magnetic permeability	Henry m

(iii) A bar magnet has length- 3 cm, cross-sectional area 2 cm^2 and magnetic moment 3 A m^2. The intensity of magnetisation of bar magnet is

(a) 2×10^5 A/m
(b) 3×10^5 A/m
(c) 4×10^5 A/m
(d) 5×10^5 A/m

(iv) The relative permeability of iron is 6000. Its magnetic susceptibility is

(a) 5999
(b) 6001
(c) 6000×10^{-7}
(d) 6000×10^{7}

35	Power (P) of a lens is given as the reciprocal of focal length (P=1/f) where f should be in meter and P is in Diopter, for convex power is positive and concave power is negative. When two or more lenses are kept in contact then power of the combined lens is given as P= P1 + P2+P3 ……. (i) A convex and a concave lens is separated by distance d are then put in contact then the focal length of the combination (a) becomes 0 (b) remain the same (c) decreases (d)increases. (ii)The two lenses of power +1.5D and +1.0D are placed in contact then the effective power of the combination will be (a)2.5D (b)1.5 D (c) 0.5D (d)3.25D (iii) If the power of the lens is 5D then what is the focal length of the lens? (a)10cm (b) 20cm (c)15cm (d) 5cm (iv)Two thin lens of focal length +10cm and -5cm are kept in contact , the power of the combination is ? (a)-10D (b)-20D (c)10D (d)15D	
THE END		

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