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FOR PUNJAB CLASS 12 PREPARATION

PSEB 12th Sample Paper 2027 Physics

EXAM	YEAR	TYPE	SUBJECT
Punjab Class 12	2027	Sample Paper	Physics

PSEB 12th Physics Question Paper (2026-27)

Section A: 1 Mark Questions (Objective)

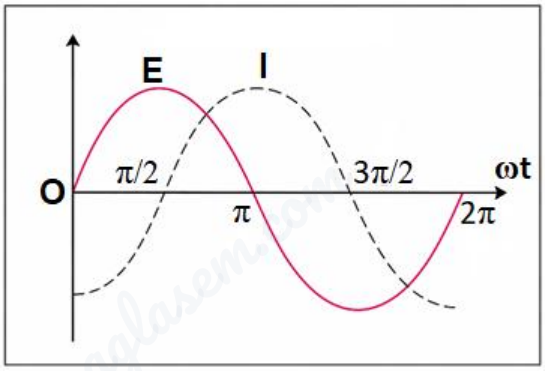
1. The direction of dipole moment of an electric dipole is always from
(a) negative to positive charge
(b) positive to negative charge
(c) along the perpendicular bisector of the dipole
(d) electric dipole moment is a scalar quantity. It has no direction.
[Knowledge, below average]

2. Why do the electrostatic field lines not form closed loops?
(a) Because electrostatic field is a non-conservative field
(b) Because electrostatic field is a conservative field
(c) Because electrostatic field lines do not cross each other
(d) Because electrostatic field lines are always perpendicular to the charged surface
[Understanding, below average]

3. The resistivity of a wire
(a) increases with the length of the wire
(b) decreases with the area of cross-section
(c) decreases with the length and increases with the cross-section of wire
(d) none of the above statement is correct
[Knowledge, average]

4. Lenz's law gives
(a) magnitude of induced emf/current
(b) direction of induced emf/current
(c) both magnitude and direction of induced emf/current
(d) neither magnitude nor direction of induced emf/current
[Knowledge, below average]

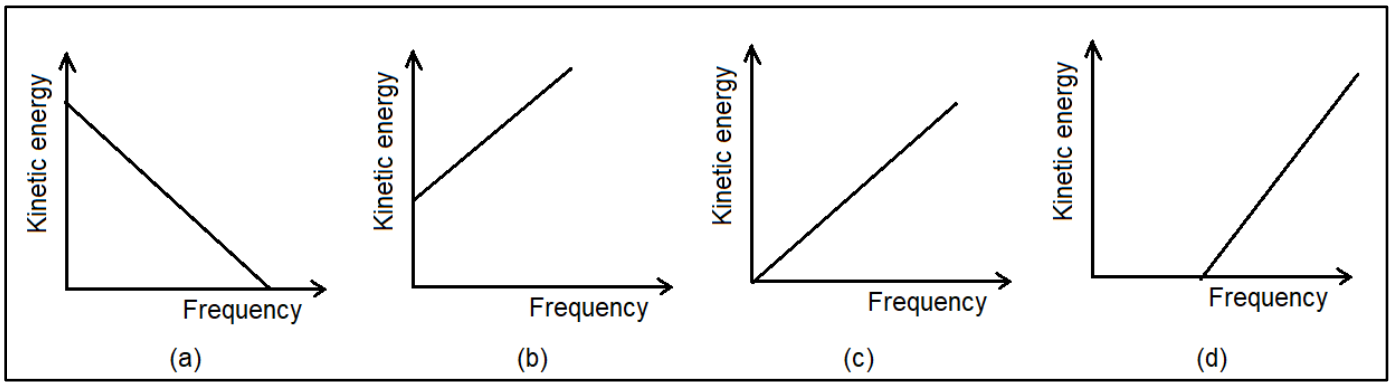
5. The variation of instantaneous current I(t) and instantaneous emf E(t) in a circuit is as shown in the figure given below. Which of the following statements is correct?



(a) The voltage lags behind the current by π/2
(b) The voltage leads the current by π/2
(c) The voltage and the current are in phase
(d) The voltage leads the current by π
[Analysis, below average]

6. Why are microwaves considered suitable for RADAR systems used in aircraft navigation?
(a) On account of larger wavelength than radiowaves, they can bend around the corners of obstacles.
(b) On account of larger wavelength than radiowaves, they can be sent as beam signals.
(c) On account of smaller wavelength than radiowaves, they can bend around the corners of obstacles.
(d) On account of smaller wavelength than radiowaves, they can be sent as beam signals.
[Understanding, average]

7. How does the focal length of a lens change when red light incident on it is replaced by violet light?
(a) increases
(b) remains same
(c) decreases
(d) may increase or decrease
[Understanding, below average]
8. In the diffraction pattern obtained in the case of a single slit, on making slit width double, the width of central maximum
(a) gets doubled
(b) becomes half
(c) remains same
(d) becomes 4 times
[understanding, below average]
9. Two thin lenses of power +10 D and -5 D are placed in contact. The focal length of the combination of two lenses is
(a) 5 cm **(b)** 10 cm **(c)** 15 cm **(d)** 20 cm
[Application average]
10. Discriminate between the intensity vs wavelength curve in case of interference and diffraction phenomenon.
(a) In interference, maximum intensity of all the fringes is same and in case of diffraction, maximum intensity decreases with increase in path difference.
(b) In diffraction, maximum intensity of all the fringes is same and in case of interference, maximum intensity decreases with increase in path difference.
(c) In interference as well as diffraction, the maximum intensity of all the fringes remains same.
(d) In interference the intensity of dark fringe may never become zero and the contrast is very poor but in diffraction, the intensity of dark fringe becomes zero and the contrast is very good.
[Analysis, average]
11. According to Einstein photoelectric equation, the graph between the kinetic energy of photoelectrons ejected and the frequency of incident radiation is

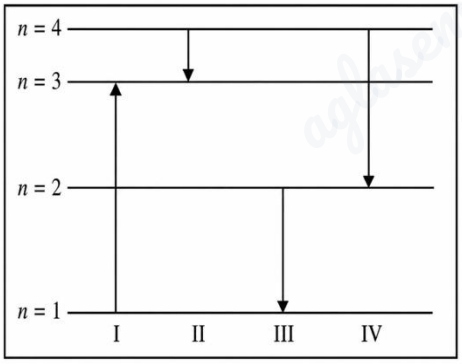


[Analysis, average]
12. Four nuclei of an element undergo fusion to form a heavier nucleus, with release of energy. Which of the two parent or daughter nucleus would have higher binding energy per nucleon?
(a) parent nucleus

(b) daughter nucleus
(c) both have same binding energy
(d) any of the two may have higher binding energy
[Understanding, average]

13. Two stable isotopes $_3Li^6$ and $_3Li^7$ have respective abundances of 7.7% and 92.5%. These isotopes have masses 6.01512 u and 7.01600 u respectively. The atomic weight of lithium is
(a) 6.941 u
(b) 6.321 u
(c) 6.561 u
(d) 6.621 u
[Application, above average]

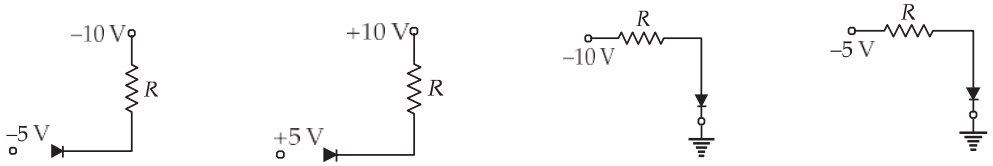
14. The diagram shows the energy levels for an electron in a certain atom. Which transition shown represents the emission of a photon with the most energy?



(a) I **(b)** II **(c)** III **(d)** IV
[Analysis, average]

15. The dominant mechanism for motion of charge carriers in forward and reverse biased silicon PN junction are
(a) drift in forward biased, diffusion in reverse biased
(b) diffusion in forward biased, drift in reverse biased
(c) diffusion in both forward and reverse biased
(d) drift in both forward and reverse biased
[Understanding, average]

16. Which of the junction diodes shown below are forward biased?



(a) **(b)** **(c)** **(d)**
[Analysis, below average]

Section B: 2 Marks Questions (VSA Type)

17. What do you mean by temperature coefficient of resistivity? What is its expression? Write its sign for metals, alloys and semiconductors or insulators. (0.5,0.5,1)
[Understanding, below average]

18. Write (without derivation) the expression of force acing per unit length between two long wires placed parallel to each other in vacuum distance r away and carrying currents I_1 and I_2 in same direction. Hence define 1 A of current. (1+1)
[Understanding, above average]

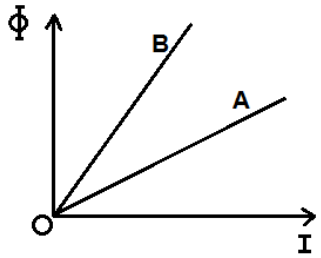
OR

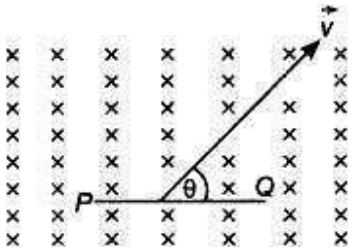
A particle of charge q and mass m is moving with velocity v. It is subjected to a uniform magnetic field B directed perpendicular to its velocity. Show that it describes a circular path. Write the expression for its radius. (1+1)

[Understanding, above average]

19. (i) plot of magnetic flux (ϕ) versus current (I) is shown in the figure for two inductors A and B. Which of the two has larger value of self-inductance?

(ii) A rod PQ of length 'l' is moved in uniform magnetic field '**B**' as shown. If the rod is moving with a velocity 'v' making an angle 'θ' with magnetic field. What will be the emf induced in it? (1+1)





[Analysis, below average]

20. What is the origin of displacement current and write its formula? Also write expression of modified Ampere circuital law. (1,1)

[Understanding, above average]

OR

Prove that energy of em radiations is distributed equally between the electric and magnetic field components of em waves. (2)

[Understanding, above average]

21. What do you mean by impact parameter? Write its expression. (1,1)

[Knowledge, average]

22. (i) Why the barrier potential difference cannot be measured even by using sensitive voltmeter?

(ii) C, Si and Ge have same lattice structure, why carbon exists as an insulator, while Si and Ge are intrinsic semiconductors? (1,1)

[Understanding, below average]

Section C: 3 Marks Questions (SA Type)

23. Find the expression for electric field due to a dipole on the equatorial line (broadside on position) and also discuss the case when dipole is too short (r >> a). (2.5,0.5)

[Understanding, above average]

OR

Using Gauss law, derive an expression for electric field due to thin infinite long charged wire (charge density λ) (3)

[Understanding, above average]

24. (i) Define the term 'mobility' of charge carriers. Write its S.I. unit. (0.5,0.5)

[Knowledge, average]

(ii) When 5 V potential difference is applied across a wire of length 0.1 m, the drift speed of electrons is 2.5×10^{-4} m/s if the electron density in the wire is 8×10^{28} m^{-3}, calculate the resistivity of the material of wire. (2)

[Application, average]

25. (i) For a para magnetic material, the dependence of the magnetic susceptibility χ on the absolute temperature is given as (a) $\chi \propto T$ (b) $\chi \propto 1/T2$ (c) $\chi \propto 1/T$ (d) independent (1)

[Knowledge, average]

(ii) Point out the role of soft iron core inside the galvanometer. Also define radial magnetic field and give its significance. (1,0.5,0.5)

[Analyze, below average]

26. (i) Show that L/R has the dimensions of time.

[knowledge, average]

(ii) A capacitor blocks DC and allows AC why?

[Understanding, average]

(iii) An ordinary moving coil ammeter used for DC can't be used to measure an AC even if its frequency is low.

[Understanding, average] (1,1,1)

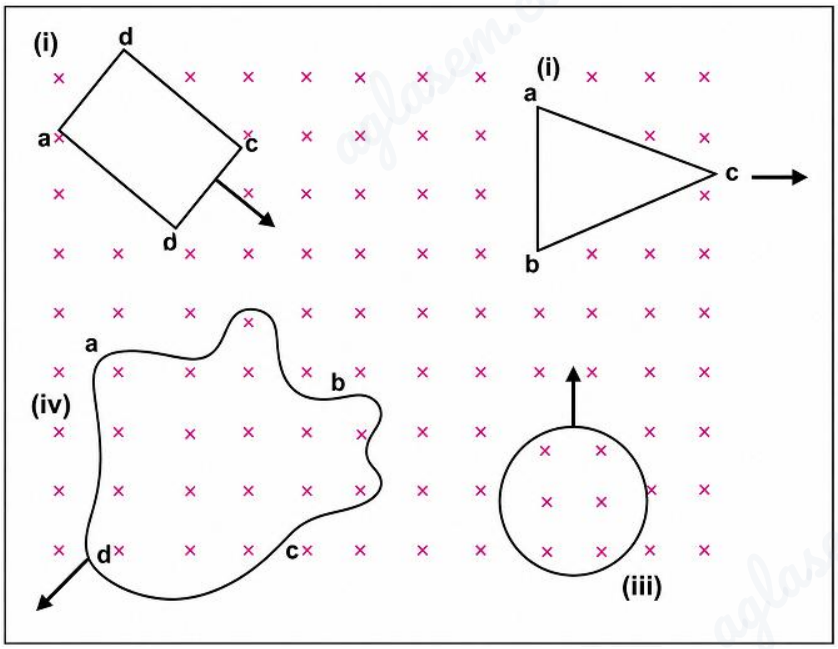
OR

(i) Interpret Faraday's second law of electromagnetic induction. (1)

[knowledge, average]

(ii) The wire loops are shown moving inside or outside a magnetic field directed inwards. Using Lenz's law, find the direction of induced current in these loops. (0.5×4 = 2)

[Understanding, average]



27. A point object O is kept in a medium of refractive index μ_1 in front of a convex spherical surface of radius of curvature R which separates the second medium of refractive index μ_2 from the first one. Draw the ray diagram showing the image formation and deduce the relationship b/w the object distance and the image distance in terms of μ_1, μ_2 and R. (3)

[Knowledge, average]

OR

Prove laws of refraction on the basis of Huygens wave theory of light. (3)

[Knowledge, average]

28. (i) Differentiate between a ray and a wavefront. What is the phase difference between any two points on a wavefront? (0.5,0.5)

[Knowledge, below average]

(ii) Show by drawing ray diagrams how a totally reflecting glass prism can be used to deviate a ray of light through (a) 90° (b) 180° inside it? (1,1)

[Analysis, average]

29. (i) If the wavelength of an electromagnetic radiation is doubled, what will happen to (a) the energy of the photons (b) the momentum of photons? (0.5,0.5)

[Knowledge, average]

(ii) The work function for Na is 2.75 eV and that for Mo is 4.175 eV. Which of these will not be able to emit photo electrons when exposed to a wavelength of 330 nm? Why? If the source is brought closer, what will be the effect on kinetic energy of the electrons emitted? (1.5,0.5)

[Application, above average]

30. (i) Doping of Si with Indium leads to which type of semiconductor? Give one more example of this type. (0.5,0.5)

[Knowledge, average]

(ii) An n-type semiconductor has a large number of electrons but still it is electrically neutral. Explain. (1)

[Understanding, below average]

(iii) A potential barrier of 0.50 V exists in a p-n junction. If the depletion region is 5.0×10^{-7} m thick, what is the electric field in this region? (1)

[Application, average]

Section D: Case Study Based Question (3 Marks)

31. When an atomic gas or vapour is excited usually by passing an electric current through it, the gas/vapour emits radiations of certain specific wavelengths only. A spectrum of this kind is called Line emission spectrum. It consists of a few bright lines on a dark background.

Balmer found an empirical relation to account for these wavelengths where $\frac{1}{\lambda} = R\left(\frac{1}{2^2} - \frac{1}{n^2}\right)$, where n = 3, 4, 5

Here, R is constant = 1.097 x 10^7 m^{-1}. It is called Rydberg constant. n is an integer having values 3, 4, 5..... etc.

For n = 3 we get λ = 656.3 nm This is H_α line.

For n = 4 we get λ = 486.1 nm This is H_β line.

For n = ∞ we get λ = 364.6 nm, which is the limit of Balmer series. Beyond this limit, the spectrum becomes continuous, though faint. Thus Balmer series lies in visible region.

Later on, Lyman series was discovered in U.V. region of the spectrum.

Paschen series was discovered in infrared region.

Brackett series was discovered in infrared region.

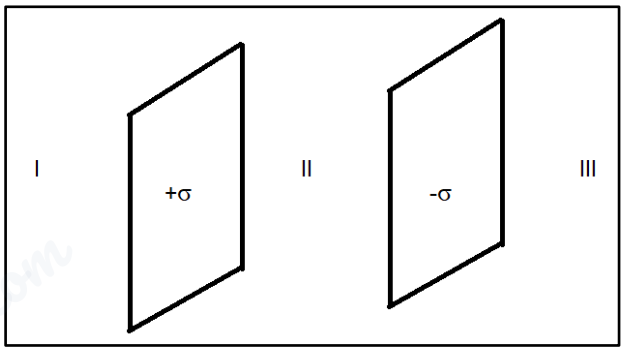
Pfund series was discovered in infrared region.

Based on the above paragraph, answer questions (i) to (iii).

(i) When an atomic gas/vapour is excited by passing an electric current through it, the gas/ vapour emits radiations of (a) all wavelengths (b) all frequencies (c) certain specific wavelengths (d) none of these
[Knowledge, above average]
(ii) The maximum wavelength in Balmer series is produced when electron jumps from n_2 to n_1 level where (a) $n_1 = 1, n_2 = \infty$ (b) $n_1 = 1, n_2 = 2$ (c) $n_1 = 2, n_2 = 3$ (b) $n_1 = 2, n_2 = \infty$
[understanding, below average]
(iii) Find the energy produced during H_β emission in hydrogen atom spectrum.
[Application, average]

Section E: 5 Marks Questions (LA Type)

32. (i) Define electric flux. Also state Gauss law in electrostatics. (1+1)
[knowledge, above average]
(ii) Make a graph of electric field due to a charged spherical shell (E) versus distance from centre (r) which clarifies the discontinuity of electric field at the surface of the shell. (1)
[Understanding, above average]
(iii) Two large thin metal plates are parallel and close to each other. On their inner faces, the plates have surface charge densities of opposite signs and magnitude 17.0×10^{-22} Cm^{-2}. What is E between the plates? (2)



[Application, above average]

OR

(i) Write the formula (without derivation) of the capacity of a parallel plate capacitor. What is the effect on capacitance if the distance between plates is reduced to half and area of plates is doubled? (1+1)
[knowledge, above average]
(ii) What will be the effect on the capacitance if the whole space between the plates is filled with some medium of dielectric constant K? (1)
[Understanding, above average]
(iii) Calculate the area of paper required to construct a parallel plate capacitor of 0.004 μF, if the dielectric constant of paper be 2.5 and its thickness 0.025 mm. (2)
[Application, above average]

33. (i) A proton and an electron travelling along parallel paths enter a region of uniform magnetic field acting perpendicular to their paths. Which of them will move in a circular path with higher frequency? Give answer with explanation. (1)
[Understanding, above average]
(ii) A square coil of side 10 cm has 20 turns and carries a current of 12 A. The coil is suspended vertically and normal to the plane of the coil makes an angle θ with the direction of a uniform horizontal magnetic field of 0.80 T. If the torque, experienced by the coil equals 0.96 N-m, find the value of θ. (2)
[Application, average]
(iii) Point out how a galvanometer can be converted into an ammeter and voltmeter. Also compare the resistances of the three devices galvanometer, ammeter and voltmeter. (1+1)
[Analyze, below average]

OR

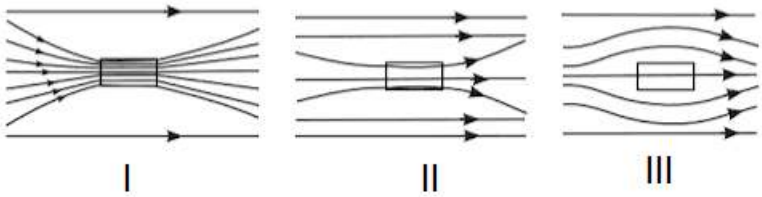
(i) Give the significance of Gauss law in magnetism $\int_S \vec{B}.\overrightarrow{dS} = 0$. (1)

[Understanding, above average]

(ii) An electron in an atom revolves around the nucleus in an orbit of radius 0-5 Å. Calculate the equivalent magnetic moment if the frequency of revolution of electron is 10^{10} MHz. (2)

[Application, average]

(iii) Categorize the materials given in the figure among dia, para and ferro magnetic substances. Also give at least one example of each type. (1,1)



[Analyze, below average]

34. (i) Draw a labeled ray diagram to show image formation by a compound microscope and write expression for its magnifying power when the final image is obtained at least distance of distinct vision. (2)

[Understanding, above average]

(ii) The radii of curvature of the faces of a double convex lens are 10cm and 15 cm. If focal length of the lens is 12 cm, find the refractive index of the material of the lens. (2)

[Application, above average]

(iii) A glass lens of refractive index 1.45 disappears when immersed in a liquid. What is the value of refractive index of the liquid? (1)

[Analyze, below average]

OR

(i) Make a labeled diagram of diffraction of light at a single slit. Write the conditions (without derivation) of path difference for the formation of diffraction maxima and minima. (2)

[Understanding, above average]

(ii) Two slits 0.125 mm apart are illuminated by light of wavelength 4500 Å. The screen is 1 m away, from the plane of the slits. Find the separation between the 2nd bright fringe on both sides of the central maximum. (2)

[Application, above average]

(iii) How diffraction of sound waves is easily observable in day to day life but diffraction of light is not so common? (1)

[Analyze, below average]

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