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OFFICE & CLASSES: SKY TUTORIALS : KABIR NAGAR DURGAKUND, VARANASI CONTACT No. : 7510020006, 9696571381

CLASSROOM CONTACT PROGRAMME

(ACADEMIC SESSION 2023-2024)

XII – JEE

Test Type: Chapter wise Test **Date: 29/09/2023**

PHYSICS

Instructions

Duration of test ***75 min*** *and questions Paper contains* ***30*** *questions. The maximum marks are* ***120.***

This Question paper contain Physics which is further divided into two sections.

Section –A contains 20 Questions Section B contains 10 questions. Please ensure that the Questions paper you have received contains ALL THE QUESTIONS in each Part.

In Section A all the 20 Questions are compulsory and in Section B Contain 10 Question, out of these 10 Questions, candidates can choose to attempt any 5 Questions.

Each Question has four choices (a), (b), (c), (d) out of which only one is correct & Carry 4 marks each 1 mark will be deducted for each wrong answer.

If you want to attempt any question then circle should be properly darkened as shown below, otherwise leave blank.

Name of Candidate ……ID. No ……..……

Candidate's Signature: ……..……Invigilator's Signature: ……..

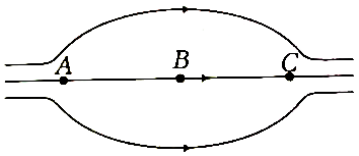
DO MORE AND MORE PRACTICE, BECAUSE PRACTICE IS THE ONLY WAY TO ACCURACY.

PHYSICS
Section – A

1. Which of the following is correct regarding electric charge?
(i) If a body is having positive charge, the there is shortage of electrons.
(ii) If a body is having negative charge, then there is excess of electrons.
(iii) Minimum possible charge $= \pm 1.6 \times 10^{-19} C$.
(iv) Charge is quantized *i.e.*, $Q = \pm ne$, where n = 1, 2, 3, 4….
(a) Both (i) and (ii) (b) Both (ii) and (iii)
(c) (i), (ii), (iii) (d) All of these

2. There are two charge $+1\mu C$ and $+5\mu C$. The ratio of the force acting on them will be.
(a) 1 : 5 (b) 1 : 1 (c) 5 : 1 (d) 1 : 25

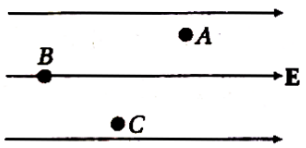
3. The figure shows some of the electric field lines corresponding to an electric field. The suggests



(a) $E_A > E_B > E_C$ (b) $E_A = E_B = E_C$
(c) $E_A = E_C > E_B$ (d) $E_A = E_C < E_B$

4. A small oil drop mass 10^{-6} kg is hanging in at rest between two plates separated by 1 mm having a potential difference of 500 V. The charge on the drop is (g = 10 ms^{-2})
(a) 2×10^{-9} C (b) 2×10^{-11} C
(c) 2×10^{-6} C (d) 2×10^{-9} C

5. A, B and C are three points in a uniform electric field. The electric potential is.

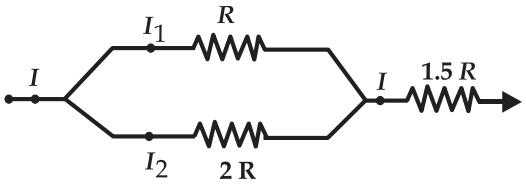


(a) Maximum at A
(b) Maximum at B
(c) Maximum at C
(d) same at all the three points A, B and C

6. It is possible to have a positively charged body at.
(a) zero potential (b) negative potential
(c) positive potential (d) All of these

7. A silver wire of radius 0.1 cm carries a current of 2A. If the charge density in silver is 5.86×10^{28} m^{-3}, then the drift velocity is
(a) 0.2×10^{-3} ms^{-1} (b) 0.4×10^{-4} ms^{-1}
(c) 0.68×10^{-4} ms^{-1} (d) 7×10^{-4} ms^{-1}

8. In the circuit diagram, heat produces in *R, 2R* and 1.5 *R* are in the ratio of.



(a) 4 : 2 : 3 (b) 8 : 4 : 27
(c) 2 : 4 : 3 (d) 27 : 8 : 4

9. A circular coil of radius 10 cm and 100 turns carries a current 1 A. What is the magnetic moment of the coil?
(a) $3.142 \times 10^4 A - m^2$ (b) $10^4 A - m^2$
(c) $3.142\ A - m^2$ (d) $3 A - m^2$

10. Two charged particles have charges and masses in the ratio 2 : 3 and 1 : 4, respectively. If they enter a uniform magnetic field and move with the same velocity, then the ratio of their respective time period of revolution is.
(a) 3 : 8 (b) 1 : 4 (c) 3 : 5 (d) 1 : 6

11. Two parallel long wires carry currents i_1 and i_2 with $i_1 > i_2$. When the currents are in the same direction, then the magnetic field midway between the wires is $10\mu T$. When the direction of i_2 is reversed, then it becomes $40\mu T$. Then, ratio of i_1 / i_2 is.
(a) 3 : 4 (b) 5 : 3 (c) 7 : 11 (d) 11 : 7

12. The magnetic flux linked with a coil (in Wb) is given by the equation $\phi = 5t^2 + 3t + 16$. The magnitude of induced emf in the coil at the fourth second will be.
(a) 33 V (b) 43 V (c) 108 V (d) 10 V

13. The radius of curvature of the convex face of a plano – convex lens is 12 cm and the refractive index of the material of the lens is 1.5. Then, the focal length of the lens is.
(a) 6 cm (b) 12 cm (c) 18 cm (d) 24 cm

14. A thin equiconvex lens of refractive index 3/2 and radius of curvature 30 cm is put in water (refractive index = 4/3), its focal length is.
(a) 0.15 m (b) 0.30 m (c) 0.45 m (d) 1.20 m

15. The mirror are inclined at an angle of 50^o. The number of image formed for an object placed in between the mirrors is.
(a) 5 (b) 6 (c) 7 (d) 8

16. In a compound microscope, the focal length of the objective is 2.5 cm and of eye lens is 5 cm. If an object is placed at 3.75 cm before the objective and the image is formed at the least distance of distinct vision, then the distance between two lenses will be.
(a) 11.67 cm (b) 12 cm
(c) 12.75 cm (d) 13 cm

17. The interference pattern is obtained with two coherent light sources of intensity ratio n. In the interference pattern, the ratio $\frac{I_{max} - I_{min}}{I_{max} + I_{min}}$ will be.
(a) $\frac{\sqrt{n}}{n+1}$ (b) $\frac{2\sqrt{n}}{n+1}$
(c) $\frac{\sqrt{n}}{(n+1)^2}$ (d) $\frac{2\sqrt{n}}{(n+1)^2}$

18. In Young's double slit experiment, the ratio of maximum and minimum intensities in the fringe system is 9 : 1. The ratio of amplitudes of coherent sources is
(a) 9 : 1 (b) 3 : 1 (c) 2 : 1 (d) 1 : 1

19. λ_1 and λ_2 are used to illuminate the slits. β_1 and β_2 are the corresponding fringe widths. The wavelength λ_1 can produce photoelectric effect when incident on a metal. But the wavelength λ_2 cannot produce photoelectric effect. The correct relation between β_1 and β_2 is
(a) $\beta_1 < \beta_2$ (b) $\beta_1 = \beta_2$
(c) $\beta_1 > \beta_2$ (d) $\beta_1 \geq \beta_2$

20. A proton and an α - particle are accelerated from rest to the same energy. The de – Broglie wavelength λ_p and λ_α are in the ratio
(a) 2 : 1 (b) 1 : 1 (c) $\sqrt{2}$: 1 (d) 4 : 1

SECTION - B

INTEGER TYPE QUESTIONS

21. If the kinetic energy of the particle is increased to 16 times its previous value, the percentage change in the de-Broglie wavelength of the particle is

22. Light of frequency 1.5 times the threshold frequency is incident on a photosensitive material. What will be the photoelectric current, if the frequency is halved and intensity is doubled?

23. The ratio of wavelength of the last line of Balmer series and the last line of Lyman series is

24. If the number of scattering particles are 56 for 90^o angle, then at an angle 60^o, number of scattered particle will be $4x$ what will be x? (In Rutherford α – scattering experiment)

25. In young's double slit experiment, green light $\left(\lambda = 5461\,\mathring{A}\right)$ is used and 60 fringes were seen in the field view. Now, sodium light is used $\left(\lambda = 5890\,\mathring{A}\right)$, then number of fringes observed are.

26. A magnifying glass of focal length 5 cm is used to view an object by a person whose smallest distance of distinct vision is 25 cm. If he holds the glass close to eye, then the magnification is.

27. A coil having an area 2 m^2 is placed in a magnetic field which changes from 1 Wbm^{-2} to 4 Wbm^{-2} in an interval of 2 s. The emf induced in the coil will be.

28. A thin rectangular magnet suspended freely has a period of oscillation 4s. If it is broken into two halves each having half their initial length, then when suspended similarly, the time period of oscillation of each part will be.

29. A long straight wire of radius a carries a steady current I. The current uniformly distributed over its cross – section. The ratio of the magnetic field **B** and **B′** at radial distance $\frac{a}{2}$ and 2 a respectively, from the axis of the wire is.

30. An ammeter connected in the circuit as shown in figure shows a reading of $\frac{3x}{8}$ what will be the value of x.