

SWAMI VIVEKANANDA MATRIC HR SEC.SCHOOL - ARUMBAVUR

STD : XII

TIME: 3.00 HRS

SUB: PHYSICS

MODEL HALF YEARLY EXAM - 2022

MARKS: 70

PART – ACHOOSE THE BEST ANSWER:

15 X 1 = 15

1. First diffraction minimum due to a single slit of width 1.0×10^{-5} cm is at 30° . Then wavelength of light used is,
(a) 400 \AA (b) 500 \AA (c) 600 \AA (d) 700 \AA
2. A radioactive nucleus (initial mass number A and atomic number Z) emits two α -particles and 2 positrons. The ratio of number of neutrons to that of proton in the final nucleus will be
(a) $\frac{A-Z-4}{Z-2}$ (b) $\frac{A-Z-6}{Z-6}$ (c) $\frac{A-Z-4}{Z-6}$ (d) $\frac{A-Z-12}{Z-4}$
3. The zener diode is primarily used as a) Rectifier b) Amplifier c) Oscillator d) Voltage regulator
4. Photons of wavelength λ are incident on a metal. The most energetic electrons ejected from the metal are bent into a circular arc of radius R by a perpendicular magnetic field having magnitude B. The work function of the metal is
a) $\frac{hc}{\lambda} - m_e + \frac{e^2 B^2 R^2}{2me}$ b) $\frac{hc}{\lambda} + 2me \frac{e^2 B^2 R^2}{2me}$ c) $\frac{hc}{\lambda} + m_e - \frac{e^2 B^2 R^2}{2me}$ d) $\frac{hc}{\lambda} - 2m_e + \frac{e^2 B^2 R^2}{2me}$
5. The particle size of ZnO material is 30 nm. Based on the dimension it is classified as
a) Bulk material b) Nanomaterial c) Soft material d) Magnetic material
6. Stars twinkle due to -----? (a) reflection (b) total internal reflection (c) refraction (d) polarisation
7. Ohm's law is not obeyed by -----?
a) Electrolytes b) Discharge tubes c) Vacuum tubes d) All the above
8. The dopant to be added with a pure germanium crystal to form 'n' type semiconductor is -----?
a) Boron b) Phosphorus c) Aluminium d) Indium
9. The colour in the soap bubble is due to ----?
a) Interference b) Reflection c) Polarisation d) Diffraction
10. A coil has a self inductance of 0.04 H. The energy required to establish a steady state current of 5 A in it is
a) 0.5 J b) 1.0 J c) 0.2 J d) 0.8 J
11. A sample of HCl gas is placed in a uniform electric field of magnitude $3 \times 10^4 \text{ N C}^{-1}$. The dipole moment of each HCl molecule is $3.4 \times 10^{-30} \text{ Cm}$. Calculate the maximum torque experienced by each HCl molecule?
a) $10.2 \times 10^{-26} \text{ Nm}$ b) $10.2 \times 10^{-26} \text{ Nm}$ c) $12.2 \times 10^{-26} \text{ Nm}$ d) $10.2 \times 10^{-26} \text{ Cm}$

12. In a meter bridge experiment with a standard resistance of $15\ \Omega$ in the right gap, the ratio of balancing length is 3:2. Find the value of the other resistance. a) $12.2\ \Omega$ b) $22.2\ \Omega$ c) $25.2\ \Omega$ d) $122.2\ \Omega$
13. Which of the following electromagnetic radiations is used for viewing objects through fog
(a) microwave (b) gamma rays (c) X- rays (d) infrared
14. In a transformer, the number of turns in the primary and the secondary are 410 and 1230 respectively. If the current in primary is 6A, then that in the secondary coil is (a) 2 A (b) 18 A (c) 12 A (d) 1 A
15. A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is (a) 1.2 (b) 0.83 (c) 0.12 (d) 0.9

PART - B

ANSWER ANY SIX QUESTIONS.Q.NO.23 IS COMPULSORY

6 X 2 = 12

16. Write down coulomb law in vector form and mention what each term represents?
17. What is meant by internal resistance of a cell?
18. State Ampere's circuital law?
19. State any two advantages of three phase alternator?
20. Write any four uses of X – rays?
21. What is principle of reversibility?
22. Give example for photo sensitive materials? Why is called so?
23. In a transistor connected in the common base configuration $\alpha = 0.95$ $I_E = 1\text{ mA}$. Calculate the value of I_C , I_B .
24. Calculate the time required for 60% of a sample of radon undergo decay. Given $T_{1/2}$ of radon = 3.8 days.

PART – C

ANSWER ANY SIX QUESTIONS.Q.NO 33 IS COMPULSORY.

6 X 3 = 18

25. List out the uses of Polaroids?
26. Compare dia, para, ferromagnetism.
27. Write the Cartesian sign convention for spherical mirrors?
28. Derive an expression for energy stored in an inductor?
29. Discuss the spectral series of Hydrogen atom?

30. The resistance of a circle 20Ω . What will be new resistance if it is stretched uniformly 8 times its original length?
31. What is photocell? Write its applications?
32. State and prove first and second De Morgan's theorem
33. (a) The dielectric constant of water is 80. What is its permittivity?
- (b) Calculate the force between electron and proton in 'H' atom?

PART - D

ANSWER ALL THE QUESTIONS.

5 X 5 = 25

34. Explain the formation of depletion region and barrier potential in P N junction diode? (OR)

Explain the young's double slit experimental setup and obtain the equation for path difference?

35. Explain in detail the construction and working of Van de Graff generator? (OR)

Obtain the equation for radius illumination?

36. Obtain Einstein's photoelectric equation with necessary explanation (OR)

Derive the expression the force between two parallel current carrying conductors?

37. Obtain the condition for bridge balance in Wheatstone bridge? (OR)

Explain the construction and working of transformer?

38. Derive the expression for n^{th} orbital of an electron using by Bohr atom model? (OR)

Write down Maxwell equation in integral form.

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PGT IN PHYSICS

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