M.M.A HIGHER SECONDARY SCHOOL- PAPPANADU

STD:XII FULL PORTION MODEL QUESTION PAPER-1-2022-2023 TIME:3.00 HOURS

SUB: PHYSICS MARKS:70

I) CHOOSE THE CORRECT ANSWER: 15×1=15

1. The speed of electromagnetic waves in independent of

a) momentum b) frequency c) intensity d) medium in which it travel

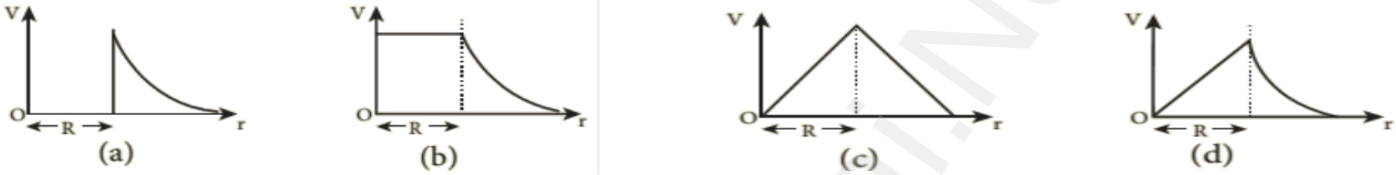
2. The half-life of a radioactive substance is 30 minutes. The time (in minutes) taken between 40% decay and 85% decay of the same radioactive substance is

a) 60 b) 15 c) 30 d) 45

3. The principle in which a solar cell operates

a.) Diffusion b) Recombination c) Photovoltaic action d) Carrier flow

4. A thin conducting spherical shell of radius R has a charge Q which is uniformly distributed on its surface. The correct plot for electrostatic potential due to this spherical shell is



5. A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly

a) 1.0 A m^2 b) 1.2 A m^2 c) 0.5 A m^2 d) 0.8 A m^2

6. In Joule's heating law, when I and t are constant, if the His taken along the y axis and I2 along the x axis, the graph is

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

7. Electric field varies as r^3 due to

a) a point change b) an infinite line charge c) an electric dipole d) an infinite plane sheet of charge

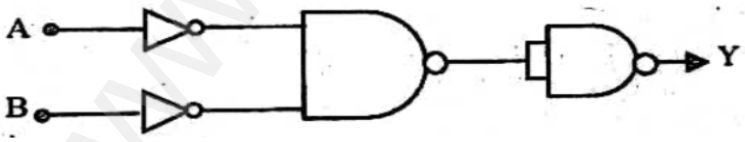
8. When the current changes from +2A to −2A in 0.05 s, an emf of 8 V is induced in a coil. The co-efficient of Self-induction of the coil is

a) 0.2 H b) 0.4 H c) 0.8 H d) 0.1 H

9. Two coherent monochromatic light beams of intensities I and 4I are superposed. Themaximum and minimum possible intensities in the resulting beam are

a) 5I and I b) 5Iand 3I c) 9I and I d) 9I and 3I

10. The following arrangement performs the logic function of



a) AND gate b) OR gate c) NOR gate d)NAND gate

11. The SI unit of magnetic flux is

a) gauss b) oersted c) tesla d) weber

12. The materials used in Robotics are

a) Aluminium and silver b) Silver and gold c) Copper and gold d) Steel and aluminum

13. Work function of Nickel is

a) 4.65 eV b) 4.70 eV c) 5.15 eV d) 5.65 eV

14. Light transmitted by Nicol prism is,

a) partially polarised b) unpolarised c) plane polarised d) elliptically polarised

15. The critical angle for water-air interface is,

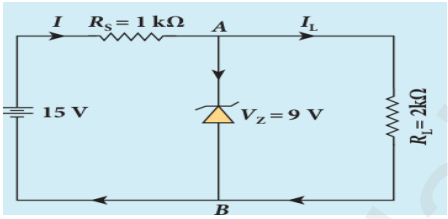
a) 41.8° b) 48.6° c) 43.3° d) 49.8°

II) ANSWER ANY SIX QUESTIONS: Q.NO:24 IS COMPULSORY: **6×2=12**

16. What are Fraunhofer lines?
17. State Fleming's left hand rule.
18. Give any two applications of RADAR.
19. What are the conditions for obtaining clear and broad interference fringes.
20. The electric field lines never intersect.Justify
21. Determine the self-inductance of 4000 turn air-core solenoid of length 2m and diameter 0.04 m.
22. Define decay rate.
23. What is Peltier effect?
24. Photoelectrons emitted by a surface have maximum kinetic energy of 4×10^{-19} J. What is the stopping potential for photo emission from the surface for the incident radiation?

III) ANSWER ANY SIX QUESTIONS: Q.NO:33 IS COMPULSORY: **6×3=18**

25. Derive the equation for silvered lens.
26. Obtain an expression for motional emf from Lorentz force.
27. Find the current through the Zener diode when the load resistance is 2 kΩ. Use diode approximation.



28. Write the applications of capacitor.
29. State and explain Brewster's law.
30. Derive an expression for de Broglie wavelength of electrons.
31. Differences between electric field and magnetic field.
32. Explain the equivalent resistance of a series resistor network.
33. Calculate the number of nuclei of carbon-14 undecayed after 22,920 years if the initial number of carbon-14 atoms is 10,000. The half-life of carbon-14 is 5730 years.

IV) ANSWER ALL THE QUESTIONS: **5×5=25**

34. (a) Obtain Einstein's photoelectric equation with necessary explanation.

[OR]

(b) Discuss the working of cyclotron in detail.

35. (a) (i)Write any six properties of electromagnetic waves.

(ii) The relative magnetic permeability of the medium is 2.5 and the relative electrical permittivity of the medium is 2.25. Compute the refractive index of the medium.

[OR]

(b) Explain the J.J. Thomson experiment to determine the specific charge of electron.

36. (a) What is dispersion? Obtain the equation for dispersive power of a medium.

[OR]

(b) Explain in detail the construction and working of a Van de Graaff generator.

37. (a) Derive an expression for phase angle between the applied voltage and current in a series RLC circuit.

[OR]

(b) Discuss the interference in thin films and obtain the equations for constructive and destructive interference for transmitted and reflected light.

38. (a) Obtain the condition for bridge balance in Wheatstone's bridge.

[OR]

(b) Describe the function of a transistor as an amplifier with the neat circuit diagram. Sketch the input and output wave forms.

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