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XII-PHYSICS 2022– 2023**

**Marks: 70
Time: 3 Hr.**

PART – I

Answer all the questions.

15 x1 = 15

I) Choose the correct option and write the answer with the option.

1. the charge of cathode rays particle is ?
a) Positive b) Negative c) Neutral d) Not defined
2. Three capacitors are connected in triangle as shown in the figure. The equivalent capacitance between the points A and C is ?
a) $1\mu\text{F}$ b) $2\mu\text{F}$ c) $3\mu\text{F}$ d) $4\mu\text{F}$
3. The threshold wavelength for a metal surface whose photoelectric function is 3.313 eV is
a) 4125 \AA b) 3750 \AA c) 6000 \AA d) 20625 \AA
4. The gravitational waves were theoretically proposed by?
a) Conrad Rontgen b) Marie Curie c) Albert Einstein d) Edward Purcell
5. A toaster operating at 240 V has a resistance of 120Ω . Its power is
a) 400W b) 2W c) 480W d) 240W
6. The temperature coefficient of resistance of a wire is 0.00125 per $^{\circ}\text{C}$. at 20°C , Its resistance is 1Ω . The resistance of the wire will be 2Ω at?
a) 800°C b) 700°C c) 850°C d) 820°C
7. Which of the following electromagnetic radiations is used for viewing objects through fog ?
a) Microwave b) Gamma rays c) X-rays d) Infrared
8. Fraunhofer lines are an example of spectrum.
a) Line Emission b) Line Absorption c) Band Emission d) Band Absorption
9. Which of the following is an electromagnetic wave?
a) α - rays b) β – rays c) γ - rays d) all of them
10. The transverse nature of light is shown in ?
a) interference b) diffraction c) scattering d) polarisation
11. Light transmitted by Nicol prism is, ?
a) partially polarised b) unpolarised c) plane polarised d) elliptically polarised
12. De Broglie wavelength ?
a) $\lambda = h/ mv$ b) $\lambda = mv/ h$ c) $\lambda = hm /v$ d) $\lambda = v/ hm$

13. The barrier potential of a silicon diode is approximately,
 a) 0.7 V b) 0.3 V c) 2.0 V d) 2.2 V
14. The zener diode is primarily used as.
 a) Rectifier b) Amplifier c) Oscillator d) Voltage regulator
15. If the input to the NOT gate is A = 1011, Its output is ?
 a) 0100 b) 1000 c) 1100 d) 0011

PART - II

II) Answer any 6 questions. Question NO. 24 is compulsory. 6 x 2 = 12

16. Give the relation between electric field and electrical potential.
17. What are ohmic and non ohmic devices?
18. Why do clouds appear white?
19. Write notes on ampere – Maxwell law.
20. what is magnetic susceptibility?
21. What is meant by Fraunhofer lines?
22. Define work function of a metal. Give its unit?
23. What is meant by radioactivity?
24. In a transistor connected in the common base configuration, $\alpha = 0.95$, $I_E = 1$ ma. Calculate the values of I_c and I_b .

PART - III

III) Answer any 6 questions. Question NO. 33 is compulsory. 6 x 3 = 18

25. State and prove De Morgan's first and second theorems.
26. List out the laws photoelectric effect.
27. Give an account of magnetic Lorentz force.
28. Write down the properties of electromagnetic wave?
29. Obtain lens maker's formula and mention its significance.
30. Elucidate the formation of n – type extrinsic semiconductors..
31. Distinguish between drift velocity and mobility.
32. What is corona discharge?
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.

PART – IV

Answer all the questions.

5 x5 = 25

34. a) Derive an expression for electrostatic potential due to an Electric dipole . (OR)
b) Describe the Microscopic model of current and obtain general form of Ohm's law
35. a) Obtain the magnetic field at a point on the equatorial line of a bar magnet (OR)
b) Prove that the total energy is conserved during LC oscillations.
36. a) Explain in detail the emission spectra and absorption spectra ? (OR)
b) Describe the Fizeau's method to determine the speed of light.
37. a) Obtain Einstein 's photoelectric equation with necessary explanation (OR)
b) Obtain the equation for bandwidth in Young's double slit experiment.
38. a) Explain the Amplitude Modulation with necessary diagrams. (OR)
b) Explain the Millikan's oil drop experiment to determine the charge of an electron.

..... ALL THE BEST.....

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