HALF YEARLY EXAMINATIONS - 2022

12 - STD **PHYSICS**

TIME: 3.00 Hrs Marks: 70

PART - A

i. Answer all questions. ii. Choose the correct answer. 15 x 1-15

1. If voltage applied on a capacitor is increased from V to 2V, choose the correct conclusion.
   (a) Q remains the same, C is doubled (b) Q is doubled, C doubled
   (c) C remains same, Q doubled (d) Both Q and C remain same
2. Two identical conducting balls having positive charges q_1 and q_2 are separated by a center to center distance r. If they are made to touch other and then separated to the same distance, the force each between them will be
   (a) less than before (b) same as before
   (c) more than before (d) zero
3. Find the heat energy produced in a resistance of 10Ω when 5 A current flows through it for 5 minutes.
   (a) 1250 J (b) 75000 J (c) 75 J (d) 7500 J
4. A toaster operating at 240 V has a resistance of 120Ω. Its power is
   (a) 400 W (b) 2 W (c) 480 W (d) 240 W
5. The conductor is placed along the direction of the magnetic field, the force experienced by the conductor,
   (a) maximum (b) minimum (c) zero (d) decreases
6. 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
7. 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
8. Which of the following is false for electromagnetic waves
   (a) transverse (b) non-mechanical waves
   (c) longitudinal (d) produced by accelerating charges
9. Stars twinkle due to,
   (a) reflection (b) total internal reflection
   (c) refraction (d) polarisation
10. Which of the following is not due to total internal reflection?
    (a) mirage on hot summer days (b) brilliance of diamond
    (c) working of optical fiber
    (d) difference between apparent and real depth of pond
11. A plane glass is placed over a various coloured letters (violet, green, yellow, red) the letter which appears to be raised more is,
    (a) red (b) yellow
    (c) green (d) violet
12. Electromagnetic wave theory could not be explained this effect
    (a) photo electric effect (b) Compton effect
    (e) Zeeman effect (d) Both a and b
13. Emission of electrons by the absorption of heat energy is called ..... emission.
    (a) photoelectric (b) field
    (c) thermionic (d) secondary

14. If the input to the NOT gate is A = 0011, its output is
(a) 0100 (b) 1000) (c) 1100 (d) 0011

15. The materials used in Robotics are
(a) Aluminum and silver (b) Silver and gold
(c) Copper and gold (d) Steel and aluminum

PART - B

Answer any SIX questions and Question No. 17 is compulsory. 6 x 2 = 12

16. List out any four uses of polaroids.
17. A radiation of wavelength 300 nm is incident on a silver surface. Will photoelectrons be observed? [Work function of silver = 4.7 eV]
18. Define atomic mass unit.
19. A diode is called as a unidirectional device. Explain.
20. State Kirchhoff's first law.
21. What is corona discharge?
22. Why are electromagnetic waves non-mechanical?
23. Define Q-factor?
24. Define amphere.

PART - C

Answer any SIX questions and Question No. 26 is compulsory. 6 x 3 = 18

25. Write down the various forms of expression for power in electrical circuit.
26. The self-inductance of an air-core solenoid is 4.8 mH. If its core is replaced by iron core, then its self- inductance becomes 1.8 H. Find out the relative permeability of iron.
27. Obtain the expression for energy stored in the parallel plate capacitor.
28. How is a galvanometer converted into an ammeter?
29. Derive the relation between f and R for a spherical mirror.
30. Write any three laws about the photoelectric effect.
31. Derive the energy expression for an electron in the n^{th} orbit using Bohr atom model.
32. State De Morgan's first and second theorem.
33. Discuss about Nicol prism.

PART - D

Answer all questions. 5 x 5 = 25

34. a. Explain in detail the construction and working of a Van De Graaff generator. ***(OR)***
b. Explain the experimental determination of refractive index of the material of the prism using spectrometer.
35. a. How the emf of two cells are compared using potentiometer? ***(OR)***
b. Derive the mirror equation and the equation for lateral magnification.
36. a. Draw the circuit diagram of a half wave rectifier and explain its working. ***(OR)***
b. Discuss the working of Cyclotron in detail.
37. a. Explain the production of induced emf by changing relative orientation of the coil with the magnetic field. ***(OR)***
b. Give the construction and working of photo emissive cell.
38. a. Write down Maxwell equations in integral form. ***(OR)***
b. Explain the JJ. Thomson experiment to determine the specific charge of electron.