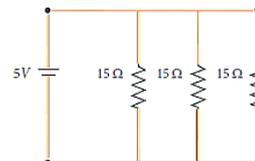




I. Choose The Correct Answer:

[15 x 1 = 15]

- 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 each other and then separated to the same distance, the force between them will be
a) less than before b) same as before c) more than before d) zero
- The internal resistance of a 2.1 V cell which gives a current of 0.2 A through a resistance of 10Ω is
a) 0.2Ω b) 0.5Ω c) 0.8Ω d) 1.0Ω
- What is the current out of the battery?
a) 1 A b) 2 A c) 3 A d) 4A
- A non-conducting charged ring of charge q , mass m and radius r is rotated with constant angular speed ω . Find the ratio of its magnetic moment with angular momentum
a) $\frac{q}{m}$ b) $\frac{2q}{m}$ c) $\frac{q}{2m}$ d) $\frac{q}{4m}$
- A step down transformer reduces the supply voltage from 220 V to 11 V and increases the current from 6 A to 100 A. Then the efficiency is
a) 1.2 b) 0.83 c) 0.12 d) 0.9
- In an AC circuit containing only capacitance, current
a) leads the voltage by 90° b) leads the voltage by 180°
c) lags the voltage by 90° d) remains in phase with voltage
- Which of the following electromagnetic radiation is used for viewing object through fog
a) microwave b) gamma rays c) X – rays d) infrared
- Which of the following is an electromagnetic radiation?
a) α – rays b) β – rays c) γ rays d) all of them
- The speed of light in an isotropic medium depends on
a) its intensity b) its wavelength
c) the nature of propagation d) the motion of the source with respect to medium
- The transverse nature of light is shown in,
a) interference b) diffraction c) scattering d) polarisation
- The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is
a) 4125 \AA b) 3750 \AA c) 6000 \AA d) 700 \AA
- If the nuclear radius of ^{27}Al is 3.6 fermi, the approximate nuclear radius of ^{64}Cu is
a) 2.4 b) 1.2 c) 4.8 d) 3.6
- 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
- The specific characteristics of a common emitter amplifier is
a) High input resistance b) Low power gain c) signal phase reversal d) Low current gain
- The material used in Robotics are
a) Al & Ag b) Ag & Au c) Cu & Au d) Steel & Al



II. Answer any 6 of the following questions:

[6 x 2 = 12]

Question number 20 is compulsory

16. What is meant by Quantization of charges?
17. Define 1 tesla.
18. Mention the ways of producing induced emf.
19. What are electromagnetic waves?
20. An object is placed at a certain distance from a convex lens of focal length 20 cm. Find the distance of the object if the image obtained is magnified 4 times.
21. What are coherent sources?
22. Calculate the time required for 60% of a sample of radon undergo decay. Given $T_{1/2}$ of radon = 3.8 days.
23. State De Morgan's first and second theorem.
24. What is Robotics?

III. Answer any 6 of the following questions:

[6 x 3 = 18]

Question number 31 is compulsory

25. List out the applications of capacitor.
26. Distinguish between drift velocity and mobility.
27. A step-down transformer connected to main supply of 220 V is made to operate 11V, 88W lamp. Calculate
(i) Transformer ratio and (ii) Current in the Primary.
28. Write down the uses of (i) UV rays (ii) IR rays
29. Why does sky appears blue?
30. Write a note on Astigmatism.
31. Calculate the maximum kinetic energy and maximum velocity of the photoelectrons emitted when the stopping potential is 81 V for the photoelectric emission experiment.
32. Define Half-life and Mean life of a radioactive nucleus? Give expression.
33. What is Robotics? List the types of Robotics.

IV. Answer the following questions:

[5 x 5 = 25]

34. a. Derive an expression for Electrostatic potential at a point due to an electric dipole.

[OR]

- b. Obtain bridge balancing condition in case of Wheatstone network.

35. a. Explain the principle and working of a moving coil galvanometer.

[OR]

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

36. a. Write down the properties of electromagnetic waves.

[OR]

b. Describe the Fizeau's method to determine the speed of light.

37. a. Obtain the equation of bandwidth in Young's double slit experiment.

[OR]

b. Describe briefly Davisson - Germer experiment which demonstrated the wave nature of electron.

38. a. Discuss the Millikan's oil drop experiment to determine the charge of an electron.

[OR]

b. A transistor functions as a switch. Explain

-----ALL THE BEST-----