

QUESTION PAPERS

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1 Which one of the following is the unit of Electric field ?

(a) Coulomb

(b) Newton

(c) Volt

(d) NC^{-1}.

2. Calculate the number of kWh in on joule :

(a) 6.3×10^{6} kWh

(b) 2.8×10^{-7} kWh

(c) 3.6×10^{6} kWh

(d) 3.6×10^{3} kWh.

3. A charged particle enters at 30° to the magnetic field. Its path becomes :

(a) circular

(b) helical

(c) elliptical

(d) straight line. 1

4. If the rms current in a 50 Hz a.c. circuit is 5A, the value of current, $\frac{1}{300}$s after its value becomes zero is :

(a) $5\sqrt{2}$ A

(b) $5\sqrt{3/2}$ A

(c) $\frac{5}{6}$ A

(d) $\frac{5}{\sqrt{2}}$ A. 1

5. For a wave propagating in a medium, identify the property that is independent of the other :

(a) velocity

(b) wavelength

(c) frequency

(d) All these depends on each other. 1

6. A short pulse of white light is incident from air to a glass slab at normal incidence. After travelling through the glass slab, the first colour to emerge is :

(a) blue

(b) green

(c) violet

(d) red. 1

7. The rest mass of photon is

(a) 1 kg

(b) Infinite

(c) 1 g

(d) zero. 1

8. When $_3Li^7$ is bombarded by protons and the resultant nuclei are $_4Be^8$, the emitted particles are :

(a) α-particle

(b) β-particle

(c) γ-photon

(d) neutron. 1

9. PN Junction diode is

(a) ohmic resistance

(b) non-ohmic resistance

(c) negative resistance

(d) positive resistance.

10. A basic communication system consists of :

(A) Transmitter

(B) Information

(C) User of information

(D) Channel

(E) Receiver.

Choose the correct sequence in which these are arranged in a basic communication system

(a) (A) (B) (C) (D) (E)

(b) (B) (A) (D) (E) (C)

(c) (B) (D) (A) (C) (E)

(d) (B) (E) (A) (D) (C). 1

11. If the refractive index of a material of equilateral prism is $\sqrt{3}$, then angle of minimum deviation of the prism is :

(a) 30° (b) 45°

(a) 60° (b) 75° 1

12. One cannot see through fog, because

(a) Light is scattered by droplets

(b) Fog absorbs the light

(c) Light suffer total internal reflection at droplets

(d) Refractive index of the fog is infinity. 1

13. Distinguish between polar and non-polar dielectrics. 2

14. Draw the graph to show variation of capacitive reactance (X_c) with frequency of the a.c source used. 2

15. Name the main parts of electromagnetic spectrum in ascending order of their wavelength.

Or

Give four properties of e.m. waves. 2

16. What is Photon? Write its two properties. 2

17. With the help of necessary circuit diagram, give working of a diode as a half-wave rectifier.

Or

Give the Logic symbol, truth table and Boolean expression for AND gate. 2

18. Derive mirror formula for concave mirror when real image is formed.

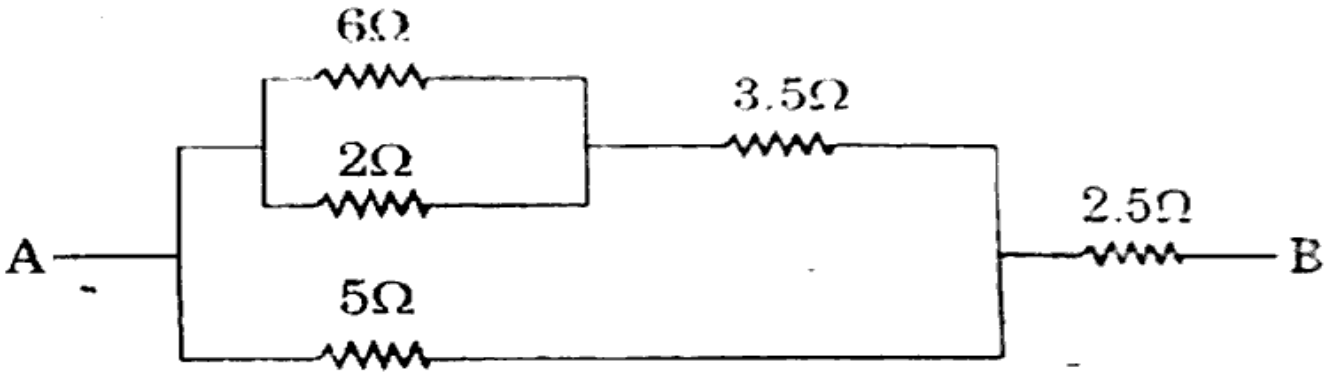
Or

Light waves can be polarised but sound waves cannot be polarised. Why? 2

19. With the help of a circuit diagram, explain how a metre bridge can be used to find the unknown resistance of a given wire. 3

20. (a) State Kirchhoff's laws in Electricity.

(b) What is the Net resistance between points A and B in the circuit shown? 3



21. (a) What is the importance of Radial magnetic field in a moving coil galvanometer?

(b) Find the force acting on an alpha particle moving with velocity $\vec{v}$ in the direction of magnetic field $\vec{B}$?

Or

Calculate the torque on a bar magnet, when placed in the uniform magnetic field. 3

22. Derive an expression for magnetic field on the axis of current carrying coil of radius 'a' at a distance 'x' from the centre of coil. 3

23. What is meant by dispersion of light? Prove that for a prism : 3

$$n = \frac{\sin\left(\frac{a + \delta m}{2}\right)}{\sin\left(\frac{A}{2}\right)}$$

Where A is angle of prism, δm is the angle of minimum deviation and 'n' is refractive index of material of prism.

24. Define the Nuclear size and Nuclear density. Show that Nuclear density is same for all Nuclei.

Or

Calculate the binding energy per Nucleons of $_{26}Fe^{56}$, given mass of $_{26}Fe^{56}$ is 55.934949 amu, mass of Neutron is 1.008665 amu, mass of proton is 1.007825 amu. 3

25. Discuss the working of n-p-n transistor as common emitter amplifier.

Or

Explain the Energy bands of solids in detail. 4

26. Discuss the Ground wave and Space wave propagation. 3

27. What is Electric flux? Write its S.I. units using Gauss theorem, derive an expression for Electric field at a point due to uniformly charged infinite plane sheet.

Or

Define the Electric dipole moment. Derive an expression for Electric field intensity at a point on the equatorial line of the Electric dipole. 4

28. What do you mean by Impedance of LCR series circuit? Derive an expression for it. What is the condition for resonance? 4

29. By stating sign conventions and assumptions, derive the expression for lens maker's formula for convex lens.

Or

What is compound Microscope? Using ray diagram, find an expression for its magnifying power when final image is at least distance of distinct vision? 4