SIR CV RAMAN COACHING CENTRE IDAPPADI ,SALEM ,

XLL PHYSICS UNIT 1 TO 5 LESSON

HALF PORTION MODEL QUESTION PAPER -2024

DATE : 09.06.2024

TOTAL MARK : 70 M

Choose the correct answer (15 x 1= 15 m)

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. A piece of copper and another of germanium are cooled from room temperature to 80 K. The resistance of

 a) each of them increases   b) each of them decreases

c) copper increases and germanium decreases   d) copper decreases and germanium increases

3. A carbon resistor of (47 ± 4.7) k Ω to be marked with rings of different colours for its identification. The colour code sequence will be

a) Yellow – Green – Violet – Gold   b) Yellow – Violet – Orange – Silver

c) Violet – Yellow – Orange – Silver   d) Green – Orange – Violet – Gold

4. Three wires of equal lengths are bent in the form of loops. One of the loops is circle, another is a semi-circle and the third one is a square. They are placed in a uniform magnetic field and same electric current is passed through them. Which of the following loop configuration will experience greater torque ?

 (a) Circle   (b) Semi-circle   (c) Square   (d) All of them

5. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?

 (a) 30^0 (b) 45^0 (c) 60^0 (d) 90^0

6. A step-down transformer reduces the supply voltage from 220 V to 11 V and increase the current from 6 A to 100 A. Then its efficiency is

 (a) 1.2   (b) 0.83   (c) 0.12   (d) 0.9

7. $20 / \pi^2$ H inductor is connected to a capacitor of capacitance C. The value of C in order to impart maximum power at 50 Hz is

(a) 50 μF   (b) 0.5 μF   (c) 500 μF   (d) 5 μF

8. Consider an oscillator which has a charged particle oscillating about its mean position with a frequency of 300 MHz. The wavelength of electromagnetic waves produced by this oscillator is

(a) 1 m   (b) 10 m   (c) 100 m   (d) 1000 m

9. The electric and magnetic fields of an electromagnetic wave are

(a) in phase and perpendicular to each other   (b) out of phase and not perpendicular to each other

(c) in phase and not perpendicular to each other   (d) out of phase and perpendicular to each other

10. To study about nuclear structure …….rays are used

   a) UV   b) IR   c) Gamma   d) visible

11. 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.

a) 2.37   b) 3.37   c) 23.7   d) 33.7

12. SI unit of mutual inductance is

 a) Tesla   b) weber   c) Henry   d) ohm

13. 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

a) 725   b) 375   c) 275   d) zero

14. Two parallel conductors carrying current in opposite direction experience a …………… force

a) repulsive   b) attractive   c) both a and b   d) none of the above

15. A current of 1A flowing through a potential difference of 1V produces a power of ……...W

A) One   b) Two   c) Three   d) zero

Answer any six questions Q .no 24 compulsory (6 x 2= 12 m)

16.What is meant by quantisation of charges?

17. Distinguish between drift velocity and mobility.

18. Define ampere.

19. Mention the ways of producing induced emf

20. Why are e.m. waves non-mechanical?

21. How will you define Q-factor?

22. A straight metal wire crosses a magnetic field of flux 4 mWb in a time 0.4 s. Find the magnitude of the emf induced in the wire

23. Compute the magnetic length of a uniform bar magnet if the geometrical length of the magnet is 12 cm. Mark the positions of magnetic pole points.

24. The resistance of a wire is 20 Ω. What will be new resistance, if it is stretched uniformly 8 times its original length?

Answer any six questions Q .no 33 compulsory (6 x 3= 18 m)

25. Obtain the expression for capacitance for a parallel plate capacitor.

26. Explain the equivalent resistance of a series

27. Compare the properties of soft and hard ferromagnetic materials.

28. An inductor of inductance L carries an electric current i. How much energy is stored while establishing the current in it

29. Write down Maxwell equations in integral form.

30. Compute the torque experienced by a magnetic needle in a uniform magnetic field

31. Consider a point charge +q placed at the origin and another point charge -2q placed at a distance of 9 m from the charge +q. Determine the point between the two charges at which electric potential is zero.

32. State and explain Kirchhoff 's rules

33. Compute the speed of the electromagnetic wave in a medium if the amplitude of electric and magnetic fields are 3×10^4 N/ C and 2×10^{-4} T, respectively

Answer all questions (5 x 5 = 25 m)

34 a) Explain the types of emission spectrum.

(or)

   b)   Write short notes on (i) microwave (ii) X-ray   (iii) radio waves (iv) visible spectrum

35 a) Explain the construction and working of transformer.

(or)

 b) Obtain an expression for average power of AC over a cycle. Discuss its special case

36. a) Obtain the magnetic field at a point on the equatorial line of a bar magnet.

(or)

  b) Derive the expression for the force on a current-carrying conductor in a

magnetic field.

37.a) Describe the microscopic model of current and obtain general form of Ohm's law

(or)

b) How the emf of two cells are compared using potentiometer?

38.a) Explain in detail the construction and working of a Van de Graff generator.

(or)

b) Derive an expression for electrostatic potential due to an electric dipole.

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

PREPARED BY

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