12th Standard PHYSICS (November and December Month Syllabus)

Revision Test Model Question Paper January 2022

Preparation : www.kalvinesan.com

Time : 03.00 hrs + 15 Minutes   **Maximum Marks : 70**

Instructions :
1. Check the question paper for fairness of printing. If there is any lack of fairness inform the hall supervisor immediately.
2. Use Blue or Black ink to write any underline

Part – 1

15 x 1 = 15

Note : (i) Answer all the Questions

(ii) Choose the most suitable answer and write the code with corresponding answer

1. Which charge configuration produces a uniform electric field?
   (a) point charge
   (b) uniformly charged infinite line
   (c) uniformly charged infinite plane
   (d) uniformly charged spherical shell

2. Two identical conducting balls having positive charges $q1$ and $q2$ are separated by a centre to centre 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

3. 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

4. A parallel plate capacitor stores a charge Q at a voltage V. Suppose the area of the parallel plate capacitor and the distance between the plates are each doubled then which is the quantity that will change?
   (a) Capacitance
   (b) Charge
   (c) Voltage
   (d) Energy density

5. 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

6. A toaster operating at 240 V has a resistance of 120 Ω. Its power is
   a) 400 W
   b) 2 W
   c) 480 W
   d) 240 W

7. In Joule's heating law, when R and t are constant, if the H is taken along the y axis and $I2$ along the x axis, the graph is
   a. a) straight line
   b) parabola
   c) circle
   d) ellipse

8. 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

9. A circular coil of radius 5 cm and 50 turns carries a current of 3 ampere. The magnetic dipole moment of the coil is nearly   a) 1.0 A m²   (b) 1. A m²   c) 0.5 A m   (d) 0.8 A m²

10. 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°   (b) 45°   c) 60°   (d) 90°

11. A thin insulated wire forms a plane spiral of $N = 100$ tight turns carrying a current $I = 8$ m A (milli ampere). The radii of inside and outside turns are $a = 50$ mm and $b = 100$ mm respectively. The magnetic induction at the centre of the spiral is

    a) 5 μT   (b) 7 μT   c) 8 μT   (d) 10 μT

12. _____ is an instrument used to measure current in an electrical circuit.

    a) Ammeter   b) Galvanometer   c) voltmeter   d) none of the above

13. 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

14. 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

15. 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

Part – 2   6 x 2 = 12

Answer any six of the Following (Question No. 24 is compulsory)

16. What for an inductor is used? Give some examples.
17. State Fleming's right hand rule.
18. Define magnetic flux.
19. State Biot-Savart's law.
20. Define current density.
21. What is Seebeck effect?
22. Write a short note on superposition principle.
23. Define 'electric flux'.
24. Define 'capacitance'. Give its unit.

Part – 3   6 x 3 = 18

Answer any six of the Following (Question No. 33 is compulsory)

25. Discuss the basic properties of electric charges.
26. Obtain Gauss law from Coulomb's law
27. State the applications of Capacitors
28. State and explain Kirchhoff's rules.
29. Give the difference between Coulomb's law and Biot-Savart's law.
30. What are the properties of bar magnet?
31. Define average value of an alternating current.

32. What are step-up and step-down transformers?

33. An electron moving perpendicular to a uniform magnetic field 0.500 T undergoes circular motion of radius 2.50 mm. What is the speed of electron?

Part – 4   5 x 5 = 25

Answer all the Questions : -

34. A) Explain the construction and working of transformer.   **[OR]**
   B) Mention the various energy losses in a transformer.

35. A) Derive an expression for electrostatic potential due to an electric dipole. **[OR]**
   B) Explain in detail the construction and working of a Van de Graaff generator.

36. A) Obtain the condition for bridge balance   **[OR]**
   B) i. State the applications of Seebeck effect.
       ii. Define electrical resistivity.

37. A) Calculate the magnetic field inside a solenoid, when

   i.   the length of the solenoid becomes twice with fixed number of turns
   ii. both the length of the solenoid and number of turns are doubled
   iii. the number of turns becomes twice for the fixed length of the solenoid.   **[OR]**
   B) Obtain a relation for the magnetic field at a point along the axis of a circular coil
       carrying current.

38. A) Dielectric strength of air is 3×10^6 V m–1. Suppose the radius of a hollow sphere in the Van de Graff generator is R = 0.5 m, calculate the maximum potential difference created by this Van de Graaff generator.   **[OR]**
   B) Prove that the total energy is conserved during LC oscillations.