GUESS Paper - 2015
Class – XII
Subject – Physics

Time: 3 Hrs MM:70

Set B

General Instructions:

(i) All questions are compulsory.
(ii) Q.No. 1 to 5 are very short answer type questions, carrying one mark each.
(iii) Q.No numbers 6 to 10 are short answer type questions, carrying two marks each.
(iv) Q.No. 11 to 22 are also short answer type questions, carrying three marks each.
(v) Q.No. 23 is a value based question carry 4 mark.
(vi) Q.No 24 to 26 are long answer type questions, carrying five marks each.

1. Find the electric field at a point on the right bisector line of the electric dipole.

2. The potential difference across a given copper wire is increased. What happen to the drift velocity of the charge carriers?

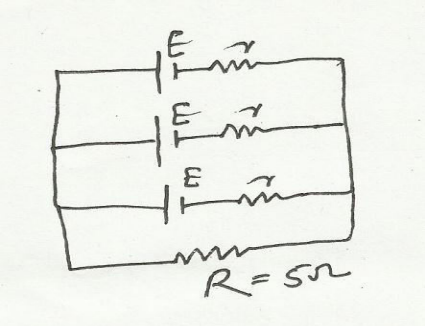
3. In what direction would a compass needle align if taken to geographic (i) North and (ii) South pole?

4. What is motional emf? Derive an expression for it.

5. Draw a sketch of plane electromagnetic wave propagating along Z – direction. Depict clearly the directions of electric and magnetic fields varying sinusoidal with Z.

6. What do electric lines of force represent? Explain repulsion between two like charges on their basis.

7. Three identical cell s each of emf 2 V and unknown internal resistance are connected in parallel. This combination is connected to a 5 ohm resistor. If the



8. terminal voltage across the cell is 1.5 V, what is the internal resistance of each cell?
9. How does the mutual inductance of a pair of coil change when
   (i) Distance between the coils is increased and
   (ii) Number of turns in the coils is increased?

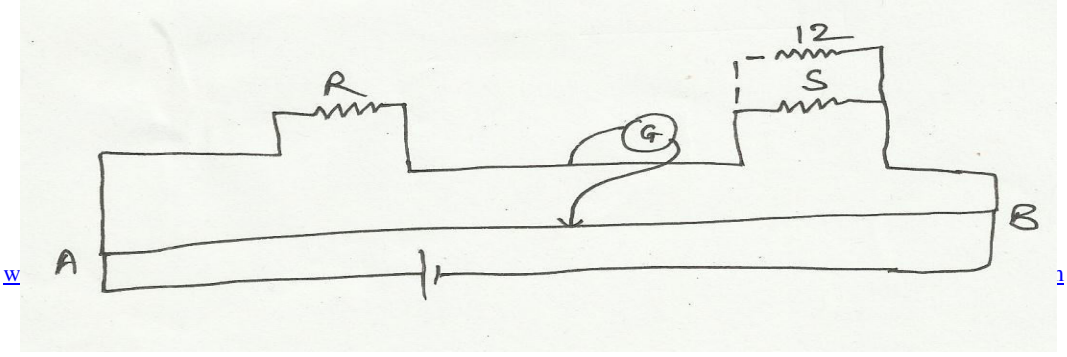
10. State faraday's law of electromagnetic induction. Express it mathematically.
    OR
    How eddy currents produced? Give two applications of eddy currents.

11. Long distance radio broadcasts use short wave band. Why?

12. Derive an expression for energy stored in a parallel plate capacitor with air as medium between the plates.
    Air is replaced with dielectric medium of dielectric constant K. How does it change the total energy of the capacitor?

13. Calculate the electric potential at a point X due to a charge of +0.5 micro coulomb located at 10cm from it. Also calculate the work done in bringing a charge of 3 x 10^{-9} c from infinity to point X.

14. In a metre bridge, the null point is found at a distance of 40 cm from A. If a resistance of 12 ohm is connected in parallel with s the null point occurs at 50.0



cm from A. Determine the value of R and S

15. State and explain the principle of Wheat Stone's principle. Deduce it using Kirchhoff's laws.

OR

Give the principle of a potentiometer. Explain how will you use potentiometer to

(i) To measure the internal resistance of the cell and

(ii) To compare the emfs of two cells.

16. Explain the variation of resistance and resistivity with temperature and hence define temperature coefficient of resistance and resistivity.

17. Distinguish between diamagnetic and ferro magnetic materials in respect of (i) intensity of magnetization, (ii) behavior of non uniform magnetic field and (iii) susceptibility.

18. Using Ampere's circuital law, derive an expression for the magnetic field along the axis of a solenoid.

OR

Describe the various losses in a transformer and explain how the losses can be minimized.

19. Explain the principal and working of cyclotron with the help of labeled diagram.

20. Define impedence and derive an expression for it in LCR series circuit. What will be the impedance of LCR circuit at resonance?

21. Use Lenz' law to find the direction of induced emf in a coil when

(i) a north pole is brought towards the coil

(ii) north pole taken away from the coil

(iii) A south pole is brought towards the coil and

(iv) (iv) a south pole is taken away from the coil, Draw illustrations in each case.

22. What are eddy currents? Describe the applications of eddy currents.

23. What is displacement current? Why did Maxwell introduce the concept of displacement current? How does the concept of displacement current leads to the production of electromagnetic waves?

OR

Write any five electromagnetic waves in the order of decreasing frequency and write any two properties and uses of each.

24. Ranis's mother who was illiterate was folding her synthetic saree. She saw a spark coming out of it .She got frightened and called Rani. Rani being a science student gave the reason behind it. After knowing the reason her mother calmed down.
    (i) what value was displayed by Rani?

25. Discuss the motion of a charged particle in uniform magnetic field, when it moves at an angle θ with the direction of magnetic field. Prove that its path is helical. Calculate the pitch of the helical path. What will be the nature of the path when (i) angle =0 (ii) angle 180

OR

State Biot –Savart law. Using this law, Obtain an expression for the magnetic field induction at a point situated on the axis of a current carrying circular coil.

26. What do you understand by electric resistance of a conductor? Define its S.I Units. Prove that resistance of a conductor is given by

$$R = \frac{m l}{n e^2 \tau A}$$

where symbols has usual meaning.

OR

Obtain the condition for maximum current through a resistor, when a number of cells are connected

(i) in series and (ii) parallel.

The amount of charge passing through the cross-section area of wire in time t is given by $q = at^2+bt +c$. find the dimension formula of A, B, and C

27. Draw the graph showing variation of inductive reactance and capacitive reactance with frequency of applied a.c. source.

Can the voltage drop across inductor or the capacitor in a series LCR circuit be greater than applied

voltage of the a.c. source? Justify your answer.

OR

An a.c. voltage $E= E_0$ SIN wt is applied across a series combination of an inductor L, a capacitor C

and a resistor R show that the current

(I) leads the voltage, if w is less than 1/LC

(II) is in phase with voltage if w=1/LC

(III) lags the voltage if w is greater than 1/LC

What is net impedance of the circuit when w= 1/lc

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