SRIGAYATRI EDUCATIONAL INSTITUTIONS

INDIA

SR MPC | **HALF-YEARLY EXAM** | **Date: 11-09-2020**

Time: 3 Hours | **Max. Marks: 60**

IPE MODEL :: PHYSICS (60 Marks)

SYLLABUS: ***Electro Static Potential & Capacitance, Waves, Electric Charges and Fields, Current Electricity, Magnetism & Matter.***

SECTION-A

I. Answer ALL the following questions. **2 x 10 = 20 M**

1. What are the parameters used to describe a progressive harmonic wave?
2. What is Doppler Effect? Give an example.
3. Repulsion is the sure test of charging than attraction. Why?
4. Write the expression for electric intensity due to an infinite plane sheet of charge.
5. What is meant by equipotential surface?
6. Three capacitors of capacitances $1\mu F, 2\mu F$ and $3\mu F$ are connected in series

   a) What is the ratio of charges?

   b) What is the ratio of potential differences?
7. State ohm's law and write its mathematical form.
8. Why is manganin used for making standard resistors?
9. What do you understand by the magnetization of a sample?
10. Define magnetic declination.

SECTION-B

II. Answer any SIX of the following questions. **6 x 4 = 24 M**

11. Explain the modes of vibration of a stretched string with examples.
12. Derive an expression for the intensity of the electric field at a point on the axial line of an electric dipole.
13. State Gauss's law in electrostatics and explain its importance.
14. Derive an expression for the electric potential due to a point charge.
15. Derive an expression for the capacitance of a parallel plate capacitor.
16. State the working principle of a potentiometer. Explain with the help of circuit diagram how the emf of two primary cells are compared by using the potentiometer.
17. The force between two magnetic poles separated by a distance d in air is F. At what distance between them does the force become doubled?
18. Compare the properties of Para, dia and ferromagnetic substances.

SECTION-C

III. Answer any TWO of the following questions. 2 x 8 = 16 M

19. (a) Explain the formation of stationary waves in an air column enclosed in open pipe. Derive the equations for the frequencies of the harmonics produced.

(b) An open organ pipe 85 cm long is sounded. If the velocity of sound is $340\ ms^{-1}$, what is the fundamental frequency of vibration of the air column?

20. (a) State Kirchhoff's laws for an electrical network. Using these laws deduce the condition for the balance in a Wheatstone bridge.

(b) A wire of resistance 4R is bent in the form of a circle. What is the effective resistance between the ends of the diameter?

21. Derive an expression for the energy stored in a capacitor. What is the energy stored when the space between the plates is filled with a dielectric.

(a) With charging battery disconnected.

(b) With charging battery connected in the circuit.

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