RRV GIRLS HIGHER SECONDARY SCHOOL, KILIMANOOR

SECOND YEAR HIGHER SECONDARY PRE-MODEL EXAM- 2023

PHYSICS

Time: 2 Hours Cool off time 15 minutes

Maximum Score: 60

Section A

Answer any six questions from 1 to 7 **(6x1=6)**

1) Is electric dipole moment a scalar or a vector quantity.
2) A metal plate is introduced between the plates of a charged parallel plate capacitor. What is the effect on the capacitance of the capacitor.
3) Two nuclei have mass numbers in the ratio 27:125. What is the ratio of their nuclear radii
4) Define one ampere
5) State Gauss's law of magnetism
6) S.I unit of inductance is .....
7) The member of electromagnetic spectrum whose wavelength ranges from 700nm to 400 nm is .....

Section B

Answer any six questions from 8 to 14 **(6x2=12)**

8) Obtain a relation between current and drift velocity
9) A circular coil of wire consisting of 100 turns each of radius 8.0 cm carries a current of 0.40 A. What is the magnitude of the magnetic field at the centre of the coil?
10) What are the energy losses in a transformer?
11) State Snell's law of refraction.
12) Using Huygen's concept of wave front, prove the law of reflection.
13) Write any two characteristics of electromagnetic waves
14) Nuclear fusion is the source of energy in stars. Write down the reaction involved in a proton-proton cycle

Section C

Answer any five questions from 15 to 21 (5x3=15)

15) Deduce an expression for the electric field at a point on the equatorial plane of an electric dipole of length 2a.

16) Write any three differences between diamagnetism and paramagnetism

17) a) What do you mean by work function?
b) State the laws of photo electric emission.

18) The distance of an object and its real image measuring from the focus 'f' of a concave mirror are 'a' and 'b' respectively show that
$f^2 = ab$

19) a) What do you mean by polarisation?
b) Which of the following wave can be potarised. (i) X-rays (ii) Sound waves why?

20) a) Mark impact parameter by sketching the path of an alpha particle in Rutherford's experiment
b) The ground state energy of hydrogen atom is - 13.6 ev. What are the kinetic and potential energies of the electron in the state

21) On the basis of energy band diagrams, distinguish between conductors, semiconductors and insulators.

Section D

Answer any three questions from 22 to 25 (3x4=12)

22) Three capacitors of capacitance 2PF, 3PF and 4PF are connected in parallel
a) What is the total capacitance of the combination?
b) Determine the charge on each capacitor if the combination is connected to a 100V supply

23) a) Define resistivity
b) How is resistivity related to conductivity
c) Get an expression for resistivity in terms of relaxation time.

24) a) List out four properties of magnetic field lines

b) Obtain the relation connecting relative permeability and magnetic susceptibility

25) a) State Lenz's law

b) What is the use of Lenz's law?

c) Lenz's law is an accordance with law of conservation of .....

Section E

Answer any three questions from 26 to 29 (3x5=15)

26) a) Draw a ray diagram to show refraction of ray of a monochromatic light passing through a glass prism

b) Deduce the expression for the refractive index of glass in terms of angle of prism and angle of minimum deviation

27) a) State Biot-Savart's law

b) Use this law to derive the expression for the magnetic field due to a circular coil carrying current at a point along its axis

28) An AC source of emf is connected to a capacitor C

a) Draw a circuit represent it

b) Arrive at an expression for current in it

c) Draw the graphical representation of emf and current in the circuit

d) The phase difference between emf and current in the circuit is .....

29) a) The SI Unit of electric flux is .....

b) Which law connects electric flux and electric charge?

c) Use this law derive an expression for the electric field due to a uniformly charged infinite plane sheet

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