PLUS TWO PHYSICS MODEL QUESTION PAPER

KASARGOD SUBDISTRICT CLUSTER MEETING 2023 FEBRUARY(BATCH 4)

Section A
Answer any five question from 1 to 7 each carries one score

1. Unit of charge is _____
2. Work done in moving a charge along a circular path with a point charge at the centre is_____
3. Property of a conducting coil by which change in current through it induces and emf in itself is known as _____
4. Which type of electromagnetic wave is used in radar _____
5. Focal Length of a concave mirror of radius of curvature 36 cm is _____
6. _____ series of hydrogen spectrum lies in the visible region of electromagnetic spectrum

7. The stability of a nucleus _____(increases, decreases) with the increase in binding energy per
   nucleon

Section B
Answer any five questions from 8 to 14 each carries 2 score

8. Draw Wheatstone Bridge and write its balancing condition
9. State Gauss's Law for magnetism and write the mathematical expression
10. a) Write an expression for impedance offered by an LCR circuit   (1)
    b) Under what condition the circuit is used for tuning a radio   (1)
11. a) Name the phenomenon that proves light is a transverse wave   (1)
    b) State Malus law   (1)
12. Write any two postulates of Bohr atom model
13. If two nuclei have mass numbers in the ratio 1:64, write the ratio of their nuclear radius
14. Arrange the following electromagnetic waves in increasing order of wavelength
    (Gamma ray, X-rays ultraviolet ray, visible light, infrared ray, microwave, radio wave)
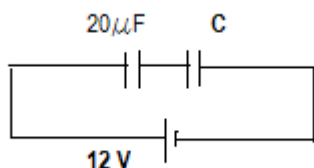
Section C
Answer any 6 questions from 15 to 21 each carries three score

15. An electric dipole is a system of two equal and opposite charges separated by a small distance
    a) Define electric dipole moment   (1)
    b) Obtain an expression for electric field at any point on the axis of an electric dipole   (2)
16. Differentiate diamagnetism, paramagnetism and ferromagnetism
17. The work function of cesium is 2.14 eV. When light ray of frequency 7 Hz is incident on the metal surface, photo emission of electrons occurs (h=$6.6 * 10^{-34}$ Js)
    a) Calculate maximum kinetic energy of emitted photons   (2)
    b) Calculate stopping potential in the emission   (1)
18. a) State Ampere's circuital law   (1)
    b) Using the law, obtain the magnetic field due to a straight wire carrying current (2)
20. a) Name the physical quantity which does not change when light and does from one medium to another
         (velocity, frequency, wavelength)   (1)
    b) On the basis of wave theory of light, prove Snell's law of refraction   (2)
21. A parallel plate capacitor consists of two metallic plate separated by a small distance with a dielectric in between
    a) Obtain an expression for capacitance of a parallel plate capacitor   (2)
    b) When a thin sheet of Mica is placed in between the plates of the capacitor its capacitance_____ (increases, decreases, remains the same)   (1)

Section D
Answer any three questions from 22 to 25 each carries 4 score

22. a) Write the working principle of an AC generator   (1)
    b) With the help of a diagram explain working of an AC generator   (3)

23. a) Draw the image formation in compound microscope when the final images at least
       distance of distinctive vision.   (2)
    b)Derive expression for magnification of compound microscope when final image is set at
       infinity.   (2)
24. Obtain the expression for resistivity in terms of relaxation time and free electron density.
25. Two capacitors are connected in series as shown in figure

20μF   C

12 V

    a) Derive the expression for effective capacitance when two capacitors are connected in
       series   (2)
    b) If the effective capacitance of the above combination is 4 μF,calculate the value of C. (2)

Section E
Answer any three questions from 26 to 29 each carries 5 score

26. Transformer is a device used to increase or decrease AC voltage
    a) What is the principle of a transformer   (1)
    a) Derive the relation connecting the number of turns of coil and voltage in the primary and
       secondary of a transformer   (2)
    b) What are the different power losses in a transformer   (2)
27. a) State Biot Savart law   (1)
    b) Using the law obtain an expression for magnetic field at an axial point of a circular coil
       carrying current   (4)
28. a) Define electric flux   (1)
    b) State Gauss's Law in electrostatics   (1)
    c) Obtain the expression for electricfield at a distance r from an uniformly charged infinitely
       long wire   (3)
29. a) Complete the ray diagram shown below   (1)

    b) Name the optical device shown in the diagram   (1)
    c) Derive an expression for refractive index of the material of the device   (3)