JAIN COLLEGE

463/465, 18th Main Road, SS Royal, 80 Feet Road, Rajarajeshwari Nagar,
Bangalore - 560 098

Date: December 2017   *SUBJECT: Physics*

II PUC
Mock Examination I

Timings Allowed: 3Hrs.   *Total Marks: 70*

General Instructions:
- All parts are compulsory.
- Answer without relevant diagram/figure wherever necessary will not carry any marks.
- Direct answers to numerical problems without detailed solutions will not carry any marks.

PART-A

I Answer **ALL** the following questions: **10x1=10**
1. A cube encloses a charge of 1C. What is the electric flux through the surface of the cube?
2. Define mobility of electron.
3. When is the force on a charge moving in a magnetic field maximum?
4. State Lenz's law.
5. Write the relation between refractive index and critical angle for a pair of optical medium.
6. What is dispersion of light?
7. In the following nuclear reaction, identify the particle X:
$$n \rightarrow p + e^- + X$$
8. Mention the principle of LED
9. Write the circuit symbol for NAND Gate.
10. Give the bandwidth of TV signal for transmission.

PART-B

II Answer any **FIVE** of the following questions: **5x2=10**
11. State and explain Coulomb's law of electrostatics.
12. Mention the factors on which the resistance of the conductor depends.
13. Write the expression for power loss in a conductor and explain the terms used.
14. Which type of magnetic material exhibits the property of hysteresis? Define coercivity.
15. Draw the neat labeled diagram of AC generator.
16. Give any two uses of microwaves.
17. What are isobars? Give example.
18. Draw the block diagram of a Receiver.

PART-C

III Answer any **FIVE** of the following questions: **5x3=15**
19. Draw a neat labelled diagram of Vandegraff generator. Mention the principle of it.
20. Obtain the expression for effective resistance of two resistors connected in parallel.
21. Mention the principle of moving coil galvanometer. Write the expression for angular deflection produced in moving coil galvanometer and explain the terms used.
22. Derive an expression for motional emf when a conductor is moving perpendicular to the magnetic field.
23. Derive an expression for resonant frequency of a series LCR circuit.
24. With a ray diagram, explain the phenomenon of total internal reflection and hence define critical angle.
25. State the postulates of Bohr's theory.
26. Write three differences between p-type and n-type semiconductors.

PART-D

IV Answer any **TWO** of the following questions: **2x5=10**

27. Derive the expression for the electric field at a point on the axis of an electric dipole.
28. Derive an expression for the balancing condition of a Wheatstone's network using Kirchhoff's law.
29. Derive an expression for the magnetic dipole moment of a revolving electron in a hydrogen atom and hence obtain the expression for Bohr Magneton.

V Answer any **TWO** of the following questions: **2x5=10**

30. Arrive at lens Maker's formula.
31. Give the experimental observations of photoelectric effect.
32. Draw the input and output characteristics of an n-p-n transistor in CE mode; hence define the terms:
    i) Input resistance   ii) Output resistance   iii) Current Amplification factor

PART-E

VI Answer any **THREE** of the following questions: **3x5=15**

33. ABCD is a square of side 2m. Charge of -5μC, +10 μC and -5 μC are placed at corners A, B and C respectively. What is the work done in transferring a charge of 6 μC from D to the point of intersection of the diagonals?
34. An α-particle is describing a circle of radius 0.45m in a magnetic field of 1.2T. Calculate its speed and frequency of rotation.
    Given: Mass of α-particle = 6.8 x 10^{-27}kg
            Charge of α-particle =3.2 x 10^{-19}C
35. A resistance of 50Ω, an inductance of 10mH and a capacitance 20μF are connected in series to a 220V, 50Hz AC source. Calculate the current in the circuit and the power factor.
36. In a Young's double slit experiment, while using a source of light of wavelength 4500A°, the fringe width is 5mm. If the distance between the screen and the plane of the slits is reduced to half, what should be the wavelength of the light to get fringe width 4mm?
37. Calculate the half- life and mean life of Radium-226 of activity 1Ci.
    Given: Mass of Radium-226 is 1g and 226g of radium consists of 6.023 x 10^{23} atoms

<p align="center">*******************************</p>