II PUC PHYSICS JUNE 2017

Part – A

I. Answer all the following questions:.   (10 × 1 = 10)

1. How does the electrostatic force between two point charges change, when a dielectric medium is introduced between them
2. State Kirchhoff's junction rule.
3. What is Lorentz force
4. Write the relation connecting rms value and peak value of alternating current.
5. What is motional electromotive force
6. Mention the value of power factor of a pure capacitor.
7. Define half life of a radioactive sample.
8. Give the circuit symbol of AND-gate.
9. Write any one advantage of light emitting diode.
10. What is attenuation in communication system

Part – B

II. Answer any FIVE of the following questions.   (5 × 2 = 10)

11. State and explain Gauss's law in electrostatics.
12. Define mobility. Mention its S.I. Unit
13. What is ohmic device? Give one example.
14. Write any two differences between diamagnetic and paramagnetic substances.
15. The magnetic flux linked with a coil varies as $\Phi = 3t^2 + 4t + 9$. Find the magnitude of the emf induced at t = 2S.
16. Write Maxwell's equation for the speed of electromagnetic waves and explain the terms.
17. What are de-Broglie Waves? How does the de-Broglie wavelength vary with momentum of moving particle
18. Draw the block diagram of generalised communication system.

Part – C

III. Answer any five of the following question: (5 × 3 = 15)

19. Obtain the relation between electric field and electric potential due to a point charge.
20. Derive the relation $\vec{j} = \sigma \vec{E}$ with terms which has usual meaning.
21. How can a moving coil galvanometer be converted into a voltmeter
22. Mention any three applications of eddy currents.
23. Define critical angle. Write two conditions for total internal reflection.
24. Write any three differences between interference and diffraction.
25. Define the terms:
   - Threshold frequency
   - Work function.
   - Stopping potential.
26. Explain the use of Zener diode as a voltage regulator

Part – D

IV. Answer any two of the following questions:.   (2 × 5 = 10)

27. Derive an expression for the electric field due to an electric dipole at a point on the axial line.
28. Obtain an expression for the force between two straight parallel conductors carrying current. Hence define ampere.
29. Show that a current carrying solenoid is equivalent to a bar magnet.

V. Answer any two of the following questions: (2 × 5 = 10)

30. Derive the lens maker's formula.
31. Derive an expression for the total energy of an electron in stationary state of hydrogen atom. Assuming the expression for the radius.
32. What is amplification? With a circuit diagram, explain the working of npn transistor as an amplifier in CE configuration.

VI. Answer any three of the following: (3 × 5 = 15)

33. In a parallel plate capacitor with air between the plates , each plate has an area 8×10^{-3} m^2 and distance between the plates is 2 mm. Calculate the capacitance of the capacitor. If this capacitor is connected to a 50 V supply, what is the charge on each plate of the capacitor? (Absolute permittivity of free space = 8.85×10^{-12} Fm^{-1})

34. Three resistors 4 Ω, 6 Ω, and 8 Ω are combined in parallel. What is the total resistance of the combination?
If the combination is connected to a battery of emf 25 V and negligible Internal resistance, then determine the current through each resistor and total current drawn from the battery.

35. A sinusoidal voltage of peak value 285 V is applied to a series LCR circuit in which resistor of resistance 5 Ω, pure Inductor of Inductance 28.5 mH and capacitor of capacitance 800 μ F are connected.
Find the resonant frequency.
Calculate the impedance, current and power dissipated at the resonance.

36. In Young's double slit experiment distance between the slits is 0.5 mm. When the screen is kept at a distance of 100 cm from the slits, the distance of ninth bright fringe from the centre of the'fringe system is 8.835 mm. Find the wavelength of light used.

37. Calculate the Binding energy and binding energy per nucleon of an oxygen nucleus ($_8O^{16}$) using the following data(MeV):
Mass of proton = 1.007825 u
Mass of neutron = 1.008665 u
Mass of oxygen nucleus = 15.995 u.