B. Sc. (Sem. V) (CBCS) (W.E.F. 2012) Examination

August – 2021

Physics : Paper - 502

(Electricity, Magnetism and Solid State electronics)
(Old Course)

Faculty Code : 003
Subject Code : 001502

Time : $2\frac{1}{2}$ Hours]   [Total Marks : **70**

Instructions : (1)   All questions are compulsory.

(2)   Symbols have their usual meaning.

(3)   Figures on right side indicate marks.

1   Answer the questions :   **20**

(1)   What is the unit of $\in_0$ in S.I. system ?

(2)   Write Poisson's equation.

(3)   Write the differential form of Gauss's law.

(4)   Write the equation of continuity.

(5)   Divergence of a magnetic field is _____.

(6)   Write the integral form of Faraday's law.

(7)   The direction of induced emf in a circuit is given by _____.

(8)   The force experienced by a charged particle moving in a magnetic field is independent of _____.

(9)   In electrodynamics $\vec{\nabla} \times \vec{B} =$ _____.

(10) What is the function of alternator ?

(11) RC coupling is used for _____ amplification.

(12) For amplification of very low frequency, which kind of coupling scheme is employed ?

(13) Define : Thermal runaway.

(14) Normally the last stage of multistage amplifier is _____.

(15) A zener diode is used as a _____ voltage regulating device.

(16) Define : Regulated power supply.

(17) What is the function of filter in power suppliers ?

(18) Inside the CRT, a graphite coat is also known as _____.

(19) The heart of an oscilloscope is _____.

(20) For power amplification, which coupling device is employed ?

2 (A) Answer the questions : (any **three**)   6

    (1) Define electric flux.

    (2) Explain Curl of B.

    (3) Define : Magnetostatic.

    (4) State Faraday's law of electromagnetic induction and give the mathematical statement.

    (5) Explain Gauss's law.

    (6) Write Maxwell's equations.

(B) Answer the questions : (any **three**)   9

    (1) Calculate the work done to move charge in electric field E.

    (2) Write a note on vector potential of magnetic field.

    (3) Explain : Force on a current 100 p in a uniform magnetic field.

    (4) Write a short note on Ampere's law.

    (5) Explain Curl of $\overline{E}$.

    (6) Derive Poisson's equation and Laplace equation.

(C) Answer the questions : (any **two**)   **10**

   (1) State and prove Gauss's law in electrostatic.

   (2) Compare electrostatic and magnetostatic.

   (3) Write a note on sources of energy.

   (4) Write down Maxwell's field equations and prove Poynting theorem.

   (5) Give brief idea of force on a current in a magnetic field.

3 (A) Answer the questions : (any **three**)   **6**

   (1) What do you understand by multistage transistor amplifier ?

   (2) Write advantages and disadvantages of RC coupled amplifier.

   (3) Define : Class B power amplifier.

   (4) What is voltage regulation ? Write the equation of it.

   (5) Give definition of power dissipation capability of power amplifier.

   (6) Give the circuit diagram of push-pull amplifier.

  (B) Answer any **three** :   **9**

   (1) Discuss frequency response of RC coupled amplifier.

   (2) Explain : Heat sink.

   (3) Explain short-circuit protection.

   (4) Mention six applications of CRO.

   (5) Explain how impedance matching is achieved by transformer coupling.

   (6) Explain voltage regulation.

(C) Answer any **three** :   **10**

    (1) Explain arrangement, operation and frequency response of transformer coupled amplifier.

    (2) Show that the maximum collection efficiency of class A transformer coupled power amplifier is 50%

    (3) Write a note on regulated power supply and also justify the needs of regulated power supply.

    (4) Explain the classification of power amplifier.

    (5) Draw a block diagram of CRO and explain each stage.

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