



JW-003-001502 Seat No. _____

B. Sc. (Sem. V) (CBCS) Examination

October - 2019

Physics : P-502

[Ele. Mag. Solid State Electro.]

(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) Figure on right side indicate marks.

1 Answer the questions :

20

- (1) Write Laplace equation for electrostatics.
- (2) Write the differential forms of Gauss's law.
- (3) What is equation of continuity ?
- (4) What is the instantaneous value of current ?
- (5) The direction of induced emf in a circuit is given by _____.
- (6) Write equation of Faraday's law (Differential form).
- (7) What is S.I. unit of magnetic induction field ?
- (8) The force experienced by a charged particle moving in magnetic field is independent of _____.
- (9) Which power plant is simple and clean ?
- (10) What is primary source of energy ?
- (11) _____ coupling provides the maximum voltage gain.
- (12) RC coupling is used for _____ amplifier.

- (13) The frequency response of transformer coupling is _____.
- (14) The push-pull circuit must use _____ operation.
- (15) A two transistor class B power amplifier is commonly called _____ amplifier.
- (16) Power amplifier handle _____ signals compared to voltage amplifier.
- (17) A zener diode utilizes _____ characteristics for voltage regulation.
- (18) A zener voltage regulator is used for _____ load current.
- (19) The CRO provides a _____ dimensional visual display of the signal wave shape of its screen.
- (20) Digital instruments use _____ circuits.

2 (a) Answer the questions : (any three) 6

- (1) Derive Poisson equation for electrostatic.
- (2) In a region an electric field is $E = 2\hat{i} + 3\hat{j} + \hat{k}$ calculate the electric flux through the surface $\vec{A} = 10\hat{i}$.
- (3) Explain Curl of vector \vec{E} .
- (4) Explain divergence of vector \vec{B} .
- (5) Explain Faraday's law.
- (6) Explain force on a current in a magnetic field.

(b) Answer the questions : (any three) 9

- (1) Explain disadvantages of solid flues.
- (2) Explain source of energy.
- (3) Explain : The work done to move a charge in electric field.
- (4) Explain Scalar potential.
- (5) Derive the equation of force on a current in a magnetic field.
- (6) Derive the equation of torque on a rectangular loop carrying a current and kept in a uniform magnetic field.

- (c) Answer the questions : (any two) 10
- (1) Derive the electric potential equation $\vec{E} = -\nabla V$.
 - (2) Define current, current density and derive continuity equation.
 - (3) Prove Poynting theorem.
 - (4) Explain hydroelectric power station with schematic diagram.
 - (5) Explain steam power station with schematic diagram.
- 3 (a) Answer the questions : (any three) 6
- (1) Draw a neat circuit diagram of direct coupled transistor amplifier.
 - (2) Explain the frequency response curve of transformer coupled amplifier.
 - (3) Draw the neat circuit diagram of Push-Pull amplifier.
 - (4) Explain ordinary dc power supply.
 - (5) What is the need of regulated power supply ?
 - (6) Draw the block diagram of an oscilloscope.
- (b) Answer the questions : (any three) 9
- (1) Explain frequency response of RC coupled amplifier.
 - (2) Explain thermal runaway in brief.
 - (3) Write the advantages, disadvantages and applications of Push-Pull amplifier.
 - (4) Explain the types of voltage regulators.
 - (5) Write the application of CRO.
 - (6) Explain digital voltmeter.
- (c) Answer the questions : (any two) 10
- (1) Explain RC coupled amplifier with neat circuit diagram.
 - (2) Explain the classification of power amplifier.
 - (3) Show the maximum collector efficiency of class A transformer coupled power amplifier is 50%.
 - (4) Write a short note on series feedback voltage regulators.
 - (5) Write short note on CRO.