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MAK-003-001502 Seat No. _____

B. Sc. (Sem. V) Examination

October / November – 2016

Physics : Paper - P - 502

(Electricity, Magnetism & Solid State Electronics)

Faculty Code : 003
Subject Code : 001502

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

Instructions : (1) All the questions are compulsory.
(2) Give answers of all questions in answer book only.
(3) Figures on the right indicate full marks.

1 Answer following questions : **20**

(a) Match the following : **5**

(i)	Ampere's Law	(a)	$\nabla \times E = -\frac{\partial B}{\partial t}$
(ii)	Poisson's Equation	(b)	$\nabla \cdot E = \frac{\rho}{\epsilon_0}$
(iii)	Gauss's Law	(c)	$\nabla \times B = \mu_0 J$
(iv)	Laplace's Equation	(d)	$\nabla \cdot E = -\frac{\rho}{\epsilon_0}$
(v)	Faraday's Law	(e)	$\nabla^2 V = 0$

(b) Fill in the blanks : **15**

(1) In magnetostatics the continuity equation is given by _____.

(2) A moving charge will gain energy due to the application of _____ field.

(3) The primary source of energy is _____.

(4) The calorific value of a solid fuel is expressed in _____ or _____.

(5) _____ coal has highest calorific value.

(6) The frequency response of _____ coupling is poor.

(7) The frequency response of RC coupling is _____.

(8) The ratio of a.c. output power to the zero signal power supplied by the battery of a power amplifier is known as _____.

(9) The maximum collector efficiency of transformer coupled class A power amplifier is _____ %.

(10) The variation of output voltage w.r.t. the amount of load current drawn from the power supply is known as _____.

(11) _____ stage of a dc power supply uses a zener diode as the main component.

(12) In _____ voltage regulator the regulated output voltage is equal to closed-loop voltage gains times the sum of zener voltage and base-emitter voltage.

(13) In an electronic instrument _____ is used to convert the non-electrical quantity into the electrical quantity.

(14) If two signals have the same frequency, then Lissajous figure shows _____ point of tangency along horizontal axis.

(15) Analog instruments have _____ sensitivity than electronic instrument.

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

(1) What is hydroelectric power station?

(2) Define an electric current.

(3) What is an electrostatics?

(4) State Maxwell's equations for electrostatics.

(5) State Faraday's law in differential form.

(6) Explain in brief generation of electrical energy.

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

(1) Explain in brief divergence of B.

(2) Explain in brief curl of E.

(3) Explain the different terms of "work-energy theorem" of electrodynamics.

(4) Write a note on calorific value of fuels.

(5) State the advantages of liquid fuels over solid fuels.

(6) State advantages and disadvantages of hydroelectric power station.

(c) Answer any **two** questions : **10**

(1) Derive an expression for the work done to move a charge.

(2) State the different types of power stations and explain in brief any one.

(3) Explain an electric flux and derive an expression for Gauss law in differential form.

(4) Explain the term "magnetostatics" and "electrostatics".

(5) Discuss the advantages and disadvantages of nuclear power station.

3 (a) Answer any **three** questions : **6**

(1) State advantages of transformer coupled transistor amplifier.

(2) Draw the circuit diagram of two stage transformer coupled transistor amplifier.

(3) Compare power and voltage amplifier.

(4) Derive an expression for collector efficiency.

(5) What is thermal runaway?

(6) What is voltage regulation?

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

(1) Explain with circuit diagram, an ordinary D.C. power supply.

(2) State various types of voltage regulators.

(3) Explain in brief frequency response of transformer coupled amplifier.

(4) Write a short note on electron gun assembly in CRT.

(5) State any nine applications of a CRO.

(6) Write a short note on deflecting assembly in CRT.

(c) Answer any **two** questions : **10**

(1) Explain the working of transformer coupled transistor amplifier with circuit diagram.

(2) Explain the working of RC coupled transistor amplifier with circuit diagram.

(3) Explain series feedback voltage regulator with circuit diagram.

(4) Explain frequency determination by using Lissajous figures.

(5) Explain direct coupled amplifier with circuit diagram.
