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

April / May – 2015

Physics

Paper : 502 - Electricity, Magnetism & Solid State Electronics

Faculty Code : 003

Subject Code : 001502

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

Instructions: (1)   Figures on right indicate marks.

(2)   Write answer of all questions in main answer sheet.

(3)   Symbols have their usual meaning.

1   Answer following questions indicating proper choice,   **20**
followed by answer.

(1)   An ideal regulated power supply has _____ %voltage regulation?

(a)   0   (b)   1

(c)   5   (d)   10

(2)   How many diodes are used in bridge rectifier?

(a)   1   (b)   2

(c)   3   (d)   none of these

(3) Differential form of Gauss law involves _____ sign

    (a) plus   (b) minus

    (c) dot   (d) cross

(4) The electric field is the _____ of a scalar potential.

    (a) curl   (b) gradient

    (c) divergence   (d) none of these

(5) Minus sign in Faraday's law indicates _____ law.

    (a) Coulomb   (b) Ampere

    (c) Lenz   (d) Ohm

(6) Poynting theorem is also known as _____ theorem.

    (a) work-distance

    (b) work-force

    (c) work-energy

    (d) work-charge

(7) Value of e/m is

    (a) 1.76×10^{11} C/kg   (b) 1.76×10^{10} C/kg

    (c) 1.76×10^{9} C/kg   (d) 1.76×10^{8} C/kg

(8) Power means

    (a) I^2/R (b) R^2/I

    (c) I^2R (d) R^2I

(9) RC coupling is used for _____ amplification.

(a) power (b) current

(c) voltage (d) none of these

(10) Class _____ power amplifier has highest collector efficiency.

(a) C (b) B

(c) A (d) AB

(11) Charge of electron in coulomb is

(a) 1.6×10^{-19}

(b) 1.6×10^{-20}

(c) 1.6×10^{-21}

(d) none of these

(12) The current is the charge per unit _____ passing a given point.

(a) voltage (b) power

(c) time (d) resistance

(13) Steady current means

(a) eiectrostatics (b) magnetostatics
(c) electrodynamics (d) None of these

(14) _____ is the unit of magnetic flux.

(a) watt (b) weber

(c) tesla (d) None of these

(15) _____ is the primary source of energy.

    (a) water   (b) sun

    (c) nucleus   (d) fuel

(16) Transformer coupling is used for _____ amplification.

    (a) current   (b) voltage

    (c) power   (d) none of these

(17) The most costly coupling is _____ coupling.

    (a) R.C.   (b) direct
    (c) impedence   (d) transformer

(18) CRO involves

    (a) filament   (b) cathode

    (c) anode   (d) all

(19) Cathode ray means the ray of

    (a) electron   (b) proton

    (c) neutron   (d) all

(20) _____ is known as poisson's equation.

    (a) $\nabla^2 V = -\dfrac{\rho}{\in_0}$ (b) $\nabla^2 V = \dfrac{\rho}{\in_0}$

    (c) $\nabla^2 V = -\dfrac{\in_0}{\rho}$ (d) none of these

2 (A) Answer **any three** 6

       (1) Define electric flux.

       (2) Write Ampere's law in both differential and integral form.

       (3) State the Poynting theorem and mention the pointing vector.

       (4) Mention the sources of energy.

       (5) Mention the types of Power stations.

       (6) Explain Multistage Transistor Amplifier.

   (B) Answer **any three** 9

       (1) Derive Gauss's law in differential form, from its integral form.

       (2) Explain magnetic field of a steady current.

       (3) Explain Farady's law.

       (4) Explain with block diagram, how a source of energy is converted into electrical energy.

       (5) Draw a circuit diagram of transformer coupled amplifier and a characteristic plot for the same.

       (6) Explain heat sink.

   (C) Answer **any two** 10

       (1) Derive an equation of work done in moving a charge.

       (2) Compare electrostatics and magnetostatics.

(3) Explain nuclear power station in brief.

(4) Discuss R-C coupled amplifier with figure.

(5) Explain puss-pull amplifier.

3   (A) Answer **any three**   6

(1) Only mention the classification of power amplifier.

(2) Mention the function of Transistor Audio Power amplifier.

(3) Draw the circuit diagram of complimentary symmetry amplifier.

(4) Draw the circuit diagram of ordinary power supply.

(5) Define regulated power supply.

(6) Write the equation to find out the frequency with the help of LISSAJOUS figures on CRO.

(B) Answer **any three**   9

(1) Compare voltage and power amplifier in a tabular form.

(2) Explain voltage regulation.

(3) Explain minimum load resistance in the case of power supply.

(4) Explain the difference between analog and digital instruments.

(5) Mention six applications of CRO.

(6) Write short note on digital voltmeter.

(C)   Answer **any two**   10

    (1)   Write note on thermal runaway.

    (2)   Explain short circuit protection.

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

    (4)   Write short note on CRO.

    (5)   Prove that maximum collector efficiency of transformer coupling class-A power amplifier is 50%.

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