

II B.Tech I Semester(R07) Supplementary Examinations, May/June 2010
ELECTRICAL AND ELECTRONICS ENGINEERING
(Common to Civil Engineering and Mechanical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. When a DC voltage is applied to a capacitor, the voltage across its terminals is found to build up in accordance with $V_C = 50(1 - e^{-100t})$. After a lapse of 0.01 seconds, the current flow is equal to 2mA:
 - (a) Find the value of capacitance.
 - (b) How much energy is stored in the electric field by that time? [16]
2.
 - (a) Derive an equation of induced EMF in a DC machine.
 - (b) A 6-pole lap wound armature has 840 conductors and flux per pole of 0.018 webers. The generator is run at 1200 rpm. Calculate emf generated. [8+8]
3.
 - (a) Explain the basic principle of operation of single phase transformer.
 - (b) A 200 KVA, 3300/240 V, 50 Hz single phase transformer has 80 turns on the secondary winding. Assuming an ideal transformer, Calculate:
 - i. primary and secondary currents on full load
 - ii. The maximum value of flux
 - iii. The number of primary turns. [8+8]
4. The data obtained on 100 KVA, 1100V, 3-phase alternator is:
DC resistance test: E between lines = 6V dc, I in lines = 10 A dc
O.C test: field current = 12.5 A, Voltage between lines = 420V
SC test: field current = 12.5 A, line current = rated value.
Calculate the voltage regulation of alternator at 0.8 power factor lagging. [16]
5. The moving coil voltmeter has a resistance of 10,000 ohms, dimensions of the coil is 3cm*3cm, number of turns on the coil is 100; flux density in the air gap is $80 \times 10^{-3} \text{ Wb/m}^2$, Spring control constant is $30 \times 10^{-7} \text{ Nm/degree}$. Calculate the deflection produced by 200V. [16]
6.
 - (a) Describe the action of PN junction diode under forward bias and reverse bias.
 - (b) Explain V-I characteristics of a PN junction diode. [8+8]
7.
 - (a) What is a Bipolar junction transistor? How are its terminals named?
 - (b) Explain the operation of NPN and PNP transistors. [8+8]
8.
 - (a) Discuss the behavior of the electron when electronic and magnetic fields are applied in
 - i. parallel and
 - ii. perpendicular to each other.
 - (b) An electron having some initial velocity V_0 of $5.93 \times 10^3 \text{ m/sec}$, enter a magnetic field of density 'B' of 0.05 wb/m^2 at an angle of 45° to the field. Find time period 't' for one revolution $e = 1.62 \times 10^{-19} \text{ cb}$, $m = 9.11 \times 10^{-31} \text{ kg}$. [8+8]
