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ET-202(B)

00207

B.Tech. Civil (Construction Management) / B.Tech. Civil (Water Resources Engineering)

Term-End Examination

June, 2013

ET-202(B) : PRINCIPLES OF ELECTRICAL SCIENCES

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions in all. Use of **calculator** is permissible.*

1. (a) Explain working principle of a transformer and calculate the r.m.s value of induced emf in the secondary winding of a transformer when a sinusoidal flux 0.2 Wb(max) links with 55 turns of a transformer secondary winding. **6**

(b) What do you understand by 'armature reaction' ? What is the effect of armature reaction in a d.c. generator ? **6**

(c) Mention the relative advantages and disadvantages of using a digital indicating instrument over an analog instrument. **2**

2. (a) Give relationship between line and phase quantities (voltage and current) in a star connected circuit and show them on a phasor diagram. **6**

(b) A capacitor draws a current of 5 mA from 200V, 50 Hz a.c supply. What current does it draw from 40V , 400 Hz supply. 6

(c) A balanced three phase load is formed by three impendances of $60+j90$ ohms each, connected in delta. If this load is equivalent to a star connected load having $\overline{Z}_y$ in each leg of the star, calculate $\overline{Z}_y$. 2

3. (a) What are the basic components used in electrical installations ? State briefly the functions of each component. 6

(b) Explain the necessity of power factor correction. What are different methods for power factor correction ? 6

(c) What is instrument transformer ? Write its features. 2

4. (a) Draw and explain speed-torque characteristics of a d.c series motor. 6

(b) A d.c machine generates an armature voltage of 220V on no load at 1000 rpm , the field current being 2A. The armature resistance is 0.5Ω. Find its speed when it draws a current of 5A as motor from the 220V supply. (Neglect armature reaction and brush voltage drop). 6

(c) A Lissajous pattern obtained on a CRO screen has $fy = 50$ Hz. Number of touching points on horizontal tangent $= 5$ and number of touching points on a vertical tangent $= 3$. Find fx. 2

5. (a) A 3- phase induction motor is wound for 4 poles and is supplied from a 50Hz system. Calculate : 6

(i) Actual speed of the motor when running at 4% slip.

(ii) Frequency of emf induced in the motor.

(b) Explain briefly the various methods of controlling speed of DC shunt motor. 6

(c) For any two terminal network draw The venin equivalent circuit. 2

6. (a) Explain how diodes operate as AC to DC connector with the help of circuit diagrams. 6

(b) What is the basic principle of CRO ? Explain its two applications. 6

(c) Draw characteristics of an ideal operational amplifier. 2

7. (a) Explain the working of a dual slope integrating type ADC. 6

(b) What are different addressing modes available in 8085 microprocessor ? Give an example of each mode. 6

(c) Find the decimal equivalent of : 2

(i) $(1110101)_2$

(ii) $(101011)_2$