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ET-202(B)

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

Term-End Examination, 2019

**ET-202(B) : PRINCIPLES OF ELECTRICAL
SCIENCES**

Time : 3 Hours]

[Maximum Marks : 70

Note : Attempt any five questions. Use of scientific calculator is allowed. Missing data, if any, may be suitably assumed.

1. (a) State the maximum power transfer theorem. Also derive an expression for maximum power transferred to the load. [2+4=6]
- (b) Draw the Phasor diagram for the following : [2+2+4=8]
- (i) R-L Circuit
 - (ii) R-C Circuit
 - (iii) RLC Circuit (if value of capacitive reactance is more than value of inductive reactance and all circuit elements are connected in series).

2. (a) Derive relation between line and phase quantities (voltage and current) for star connection, if load is balanced. [7]
- (b) Define :
- (i) Unit step function [7]
- (ii) Stability
3. (a) Explain the principle of operation of a transformer. Also, derive an expression for the e.m.f. of an ideal transformer winding. [3+4=7]
- (b) What is an auto-transformer ? What advantages are possessed by auto-transformers ? [3+4=7]
4. (a) Draw and explain speed-torque characteristic of DC series, shunt and compound motor. [7]
- (b) What is an armature reaction ? How effect of armature reaction can be reduced ? [7]
5. (a) A 3 phase, 50 Hz induction motor has full load speed of 960 rpm. Calculate the speed of rotor field with respect to rotor structure, with respect to stator structure and with respect to stator field. [7]

- (b) Explain working of star delta starter. What are its limitations ? [7]
6. (a) How can transistor be used as switch and an amplifier ? Explain. [7]
- (b) What is a differential amplifier ? Discuss the working of differential amplifier. [7]
7. (a) Explain the following : [7]
- (i) J-K flip-flop
- (ii) Shift register
- (b) Write a program to add 87_H and 80_H and save the result in the memory address 2000_H . [7]

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