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ET-202(B)

00274

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

Term-End Examination

June, 2011

ET-202(B) : PRINCIPLES OF ELECTRICAL SCIENCES

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any five** questions. Symbols and abbreviations have their usual meaning. Use of calculator is **permitted**.*

1. (a) Explain the principle of superposition theorem. **6**

(b) Find the current drawn from the battery source for the circuit shown in Fig. 1. **8**

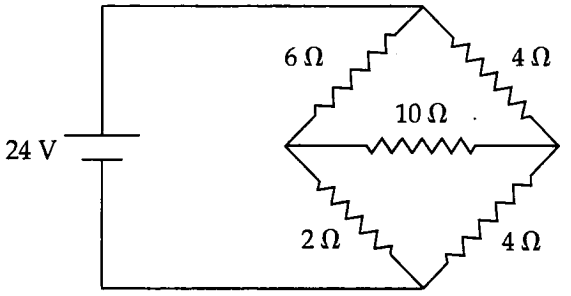

Figure - 1

2. (a) Express the following phases in (i) rectangular and (ii) polar coordinate **3+3**

$V(t) = 200 \sin(\omega t + 60°)$

(b) Draw the power triangle comprising Real Power P, Reactive Power Q and Apparent Power S. 3

(c) A 440 V, 50 Hz, 4 pole, three phase induction motor is rotating at a speed of 1440 rpm. Find the percentage slip. 5

3. (a) Explain the operation and characteristics of dc shunt motor. Give its applications. 6

(b) Explain the principle of operation of single phase transformer. Mention the salient differences between (i) Power transformer, (ii) Distribution transformer in their construction and operation. 6

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

4. (a) Name the instruments required to measure. 4

(i) Alternating current (ac)

(ii) Direct current, (dc)

(iii) ac voltage

(iv) dc voltage

(v) dc power,

(vi) ac power,

(vii) dc energy

(viii) ac energy

(b) State and describe briefly ten (10) components used in a typical industrial electrical installations. 5

(c) Draw the schematic block of a typical large unit for an industry. Explain its parts in brief. 5

5. (a) Draw and explain a full wave diode based rectifier circuit, with waveforms. 5

(b) Explain the operation of transistor as an amplifier. 5

(c) An opamp has 60 dB gain. The output voltage of the differential amplifier is 10 volt. Determine the input voltage. 4

6. (a) Draw a Half-Adder, state its truth table and explain the operation. 5

(b) Find the decimal equivalent of $(101010)_2$. 3

(c) What is Stack Pointer, Program Counter, Interrupt and Register as applied to microprocessor. 6

7. (a) Write short notes on ***any two*** : 6+6

(i) Rectifier instrument

(ii) Synchronisation

(iii) Speed control of dc series motor

(iv) Cathode Ray Oscillator (CRO)

(b) The reading of two watt meters connected to measure three phase power consumption gave the reading as 2

$W_1 = -350$ Watt $W_2 = 1200$ Watt

Calculate the power factor of the load.
