| ET-202(B)

B.Tech. Civil (Construction Management)/
B.Tech. Civil (Water Resources Engineering)
Term-End Examination
00030
June, 2015

ET-202(B) : PRINCIPLES OF ELECTRICAL SCIENCES

Time : 3 hours   *Maximum Marks : 70*

Note : *Answer any five questions in all.*

1. (a)   Explain the working principle of a transformer and calculate the r.m.s. value of the induced e.m.f. in the secondary winding of a transformer, when a sinusoidal flux 0·2 Wb (max.) links with 55 turns of a transformer secondary winding working at 50 Hz a.c. supply.   *6*

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

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

2. (a) What are interpoles ? What is their function ? Where are they placed in d.c. machine ? **6**

(b) A 200 kVA, 3300/240 volts, 50 Hz single phase transformer has 80 turns on the secondary winding. Assuming an ideal transformer, calculate : **6**

   (i) primary and secondary current on full load

   (ii) the maximum value of flux

   (iii) the number of primary turns.

(c) Draw the torque – slip characteristics of a 3-phase induction motor. **2**

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

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

(c) When are two 2-terminal networks said to be equivalent ? **2**

4. (a) Discuss how a transistor behaves as an amplifier. **6**

(b) What are the different types of instructions available in 8085 microprocessor instruction set ? **6**

(c) Draw the basic circuit diagram of a non-inverting op-amp. **2**

5. (a) Draw the different kinds of logic gates used in digital circuits. *6*

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

(c) Find the decimal equivalent of $(101011)_2$. *2*

6. (a) What is a multiplexer ? Draw the symbol of a 4-to-1 multiplexer showing various inputs and outputs and write its truth table. *6*

(b) Design a summing amplifier circuit using an operational amplifier to obtain an output voltage V_0 given by $0.1 V_{i1} - 10 V_{i2} - 102 V_{i3}$ where V_{i1}, V_{i2} and V_{i3} are input voltages. *4*

(c) Design a Wein Bridge Oscillator for a frequency of 100 kHz. *4*

7. (a) For an 8085 microprocessor : *8*

(i) What does the signal $IO/\overline{M}$ signify and how is it normally used ?

(ii) What is the function of stack pointer ?

(b) What is meant by an interrupt in a microprocessor ? List all the interrupts that are available in 8085 microprocessor. *6*

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