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ET-202(B)

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

Term-End Examination

December, 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 **scientific calculator** is permitted.*

1. (a) Explain Thevenin's Theorem using a simple circuit. **4**

(b) A conductor of 0.7 mm diameter wire has a resistance of 250 Ω. Find the resistance of the same length of wire if its diameter is doubled. **5**

(c) Find the current in 18 Ω resistor using super position theorem in Fig. 1. **5**

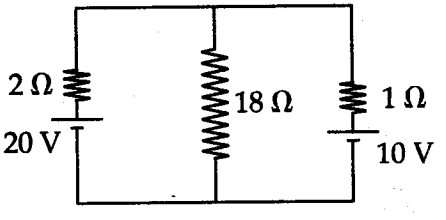


Fig. 1

2. (a) Explain the construction and operation of synchronous generator. 5

(b) A 6 pole, 50 Hz, 400 V, three phase induction motor is operating at a slip of 2.5%. Find its actual speed and slip speed. 4

(c) Describe the construction and operation of capacitor start capacitor run single phase induction motor. 5

3. (a) Discuss the load characteristics of dc shunt generator. State its applications. 5

(b) Calculate the value of emf generated by a 4-pole wave wound dc generator having 40 slots with 20 conductors per slot when driven at 1200 rpm. The flux per pole is 0.016 wb. 4

(c) Explain the speed control methods of dc series motor. 5

4. (a) Describe the different types of losses taking place in a transformer. The efficiency of transformer is higher than that of a motor. Why ? 5

(b) State the importance and methods of safety in Electrical Installations. 4

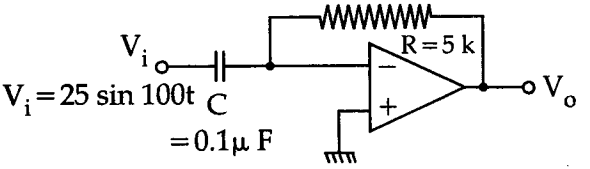
(c) Draw and discuss a typical residential wiring system. 5

5. (a) Explain the construction and operation of a typical Permanent Magnet Moving Coil (PMMC) instrument. 5

(b) Describe the circuit of OR gate and AND gate using diode. Also draw the truth table. 4

(c) Describe the three op-amp base instrumentation amplifier. What is CMRR ? 5

6. (a) Determine the output of following circuit. 4



(b) Design an op-amp based oscillator circuit to oscillate at a frequency of 100 kHz using inductor and capacitors. Hence find the value of resistor for $C = 0.01$ μF. 6

(c) Explain the application of Cathode Ray Oscillator (CRO) for phase measurement. 4

7. (a) Write short notes on *any three* : 3x4=12

(i) Flip Flops

(ii) Multiplexer

(iii) Counters

(iv) Arithmetic Logic Unit

(v) Interrupts

(b) What is the clock cycle time of an 8085 microprocessor working with a crystal of 4 MHz frequency ? 2