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007201

May 2024

B.Tech. (EL/ECE/ENC/EEIOT) (Second Semester)

Basic Electrical Technology (ESC-101-A)

Time : 3 *Hours*] [*Maximum Marks :* 75

Note : It is compulsory to answer all the questions (1.5 marks each) of Part A in short. Answer any *four* questions from Part B in detail. Different sub-parts of a question are to be attempted adjacent to each other.

Part A

1. (a) Define Superposition Theorem. **1.5**

   (b) Write the formula for star to delta and delta to star conversion. **1.5**

   (c) Differentiate between instantaneous and RMS value of any signal. **1.5**

   (d) Why efficiency of transformer is high than machine ? **1.5**

   (e) Write the formula for Synchronous speed. **1.5**

   (f) Why rotor speed is less that synchronous speed ? **1.5**

(g) Write few examples of reactive loads. **1.5**

(h) Define Switchgear. **1.5**

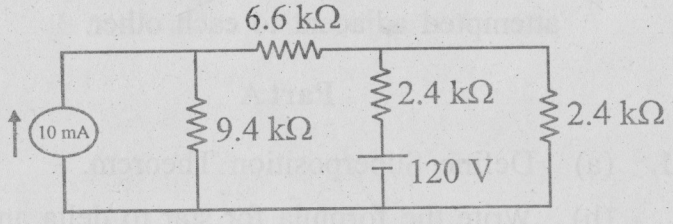
(i) How many winding are there in single-phase auto transformer ? **1.5**

(j) Write few examples of capacitive loads. **1.5**

Part B

2. (a) State the maximum power transfer theorem and explain its importance. **5**

(b) For the network shown below find the current in 24 kΩ resistance : **10**



3. (a) What do you mean by Power factor of a network ? Explain it in different terms. **5**

(b) The two element series circuit is connected across an A.C. source of $v = 200\sqrt{2} \sin (314t + 20°)$ volt and the current flows through the circuit is $i = 10\sqrt{2} \cos (314t - 20°)$. Determine the parameters of the circuit. **10**

4. (a) Why is Earthing required ? What are various type of earthings used for earthing of buildings ? Explain any *one*. **10**

(b) Describe the following in brief :

Fuses, MCB, ELCB, MCCB. **5**

5. (a) Define Transformer. Describe the applications of transformers. **5**

(b) A single-phase 50 Hz transformer has rating of 80 kVA and voltage ratio of 3200/400 volt. It is known that there are 11 turns on the secondary winding. Calculate number of primary turns, full load primary current and maximum value of mutual flux in the core. **10**

6. (a) Describe the method of measurement of 3-phase power by 2 wattmeter method. **10**

(b) A balanced star connected load of $(8 + 6j)$ ohm per phase is connected to a 3-phase, 230 V, 50 Hz supply. Find the current and Power factor. **5**

7. (a) Describe the construction and working of DC machine. **10**

(b) Describe the magnetic locking principle of synchronous machine. **5**