INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech I/II Semester Supplementary Examinations - July, 2017

Regulation: IA-R16

FUNDAMENTAL OF ELECTRICAL AND ELECTRONICS ENGINEERING
[Common for : II Semester (CSE and IT)]

Time: 3 Hours   **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) State and explain Faraday's laws of Electromagnetic Induction?   **[6M]**

   (b) For the network shown in Figure 1, find all the branch currents and voltage drops across all resistors.   **[8M]**
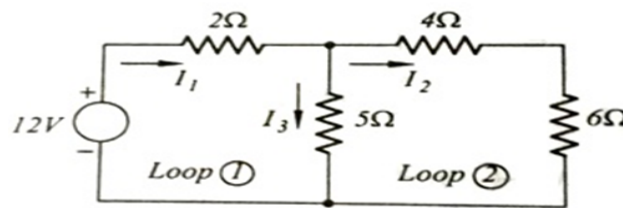

Figure 1

2. (a) Derive the expression for the voltage across capacitor and prove that the energy stored in the capacitor $E_c = \frac{1}{2}CV^2$ **[7M]**

   (b) Derive an expression for finding the equivalent capacitance when 'n' capacitors are connected in series.   **[7M]**

UNIT – II

3. (a) Using nodal analysis, find the voltage across BC and the current in the 12V source for the circuit shown in Figure 2.   **[7M]**
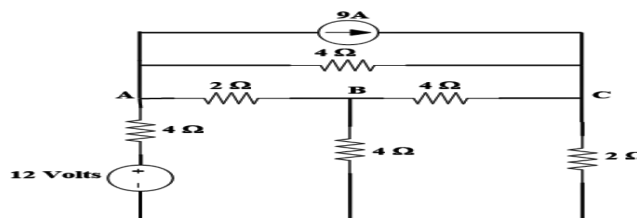

Figure 2

(b) State and explain Tellegen's theorem and superpositon theorem with an example. **[7M]**

4. (a) Prove that the maximum power could be transferred only when load resistance equals Thevinen's resistance **[7M]**

(b) Determine the current through 6 ohm resistance connected across A-B terminals in the circuit shown in Figure 3 using Thevenin's theorem. **[7M]**
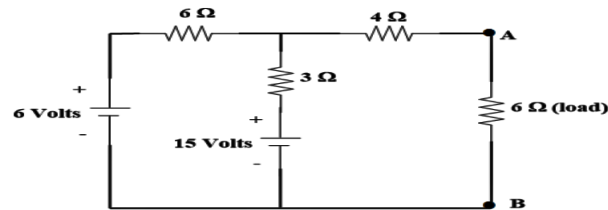

Figure 3

UNIT – III

5. (a) Two impedances (5+j31.4) and (50+j4.71) are connected in parallel across a 230V, 50Hz supply. Calculate the branch currents, total current drawn from the supply and the total power consumed. **[7M]**

(b) Show that two watt meters are sufficient to measure the total power in a balanced three phase system. Draw the phasor diagram. **[7M]**

6. (a) Determine the equivalent resistance between 'X' & 'Y' for the network shown in Figure 4 using star – delta transformation. **[8M]**
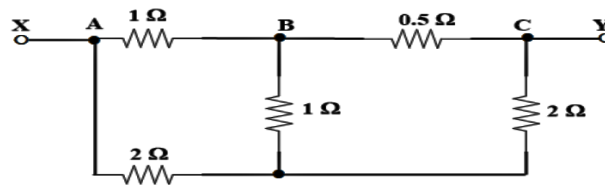

Figure 4

(b) With the help of a power triangle explain the relation between active, reactive and apparent power for inductive as well as capacitive loads. Mention their units. **[6M]**

UNIT – IV

7. (a) Explain the operation of a full wave bridge rectifier with filter. **[7M]**

(b) Draw and explain the v-I characteristics of a p-n junction diode. **[7M]**

8. (a) Draw the circuit diagram of a half wave rectifier. Explain the operation of the circuit with relevant waveforms. **[7M]**

(b) Explain the operation of a zener diode as a voltage regulator with its connection diagram and characteristic curve. **[7M]**

UNIT – V

9. (a) Explain forward and reverse bias with respect to an npn transistor. **[7M]**

    (b) With a neat circuit diagram explain the cc configuration of a transistor. **[7M]**

10. (a) Draw a neat circuit diagram of a single stage CE amplifier? Explain **[7M]**

    (b) Explain how PNP transistor can be used as an amplifier. **[7M]**

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