1E2005

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1E2005

B.Tech. I Semester (Main&Back) Examination, Dec. - 2016

105 Basic Electrical and Electronics Engg.

Time : 3 Hours　　　　**Maximum Marks : 80**

Min. Passing Marks: 26

Instructions to Candidates:

*Attempt any **five** questions, selecting **one question** from **each unit**. All questions carry equal marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Using the mesh analysis, find the current I_1, I_2 and I_3. Evaluate the power in 10V voltage source (In fig 1) **(8)**
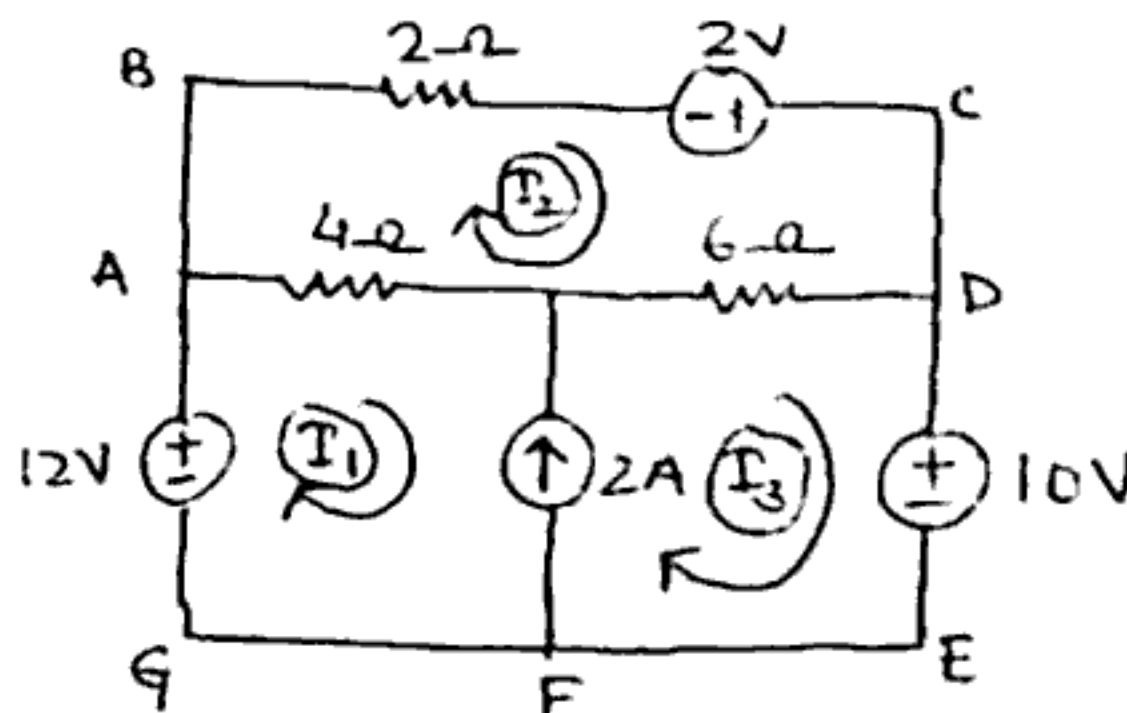

Fig: 1

   b) State & explain superposition theorem. Find current I in fig. 2 by applying superposition theorem. **(8)**
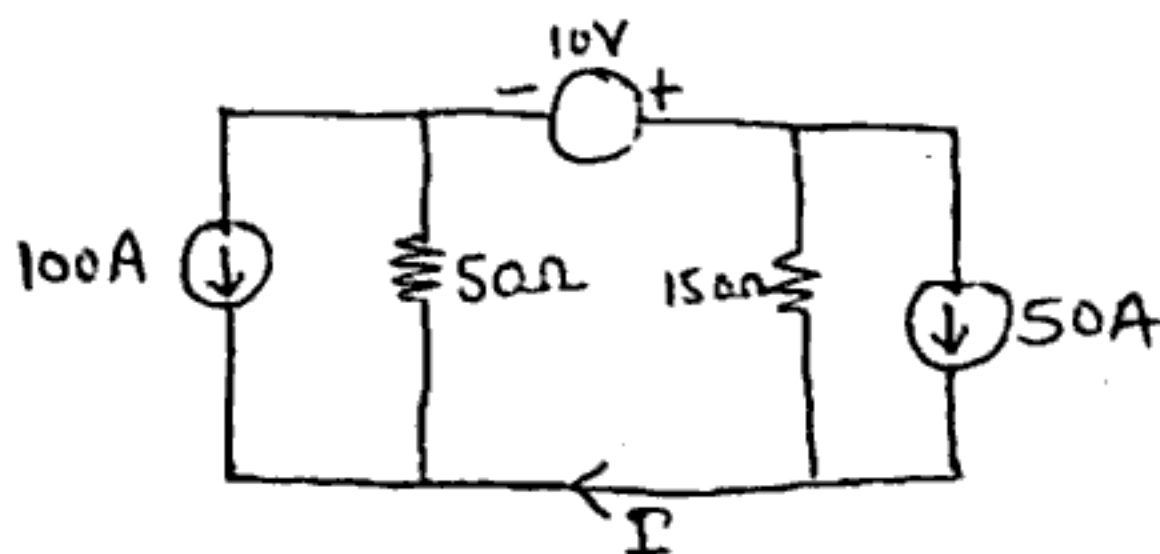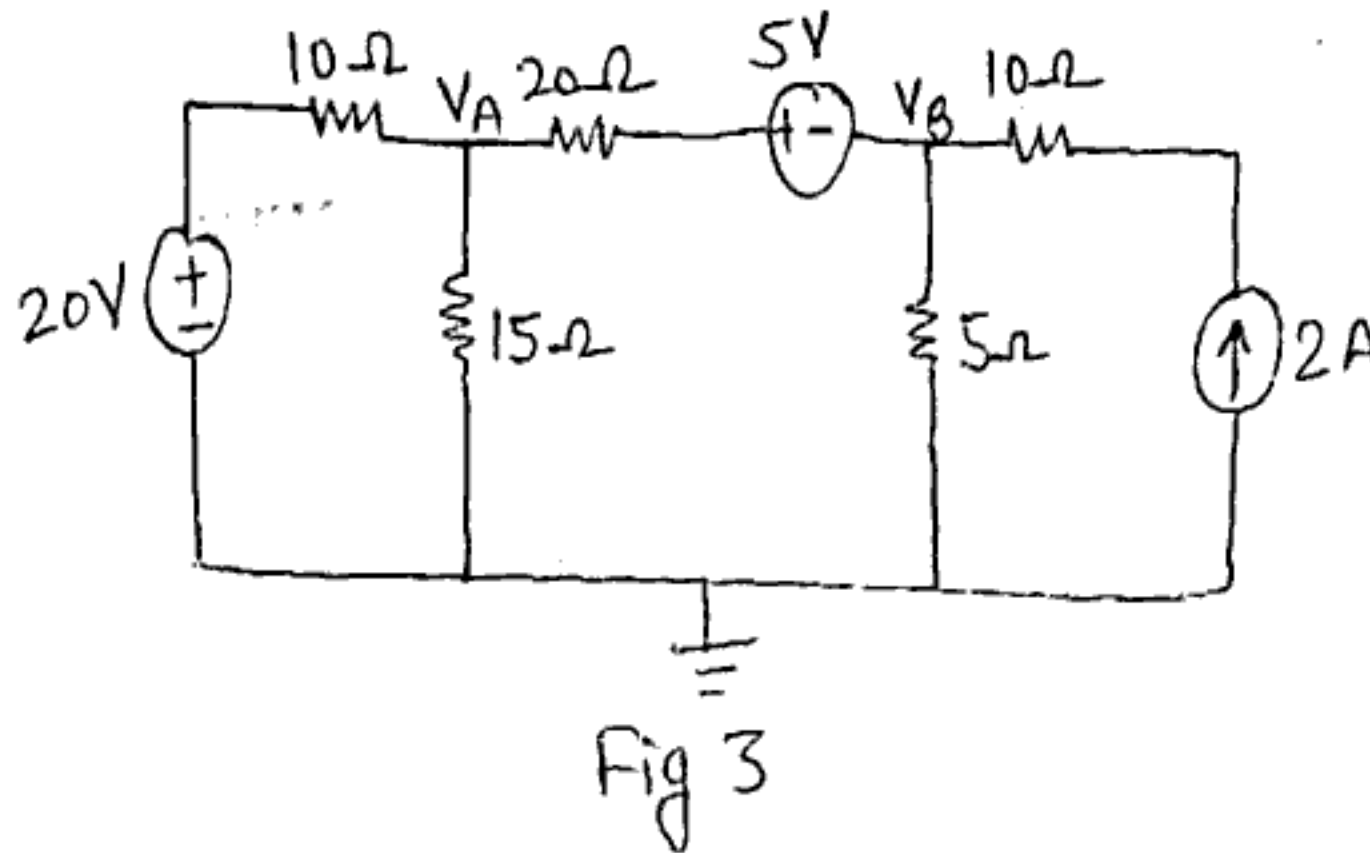

Fig : 2

OR

1. a) State and explain Thevenin's Theorem. Illustrate the application of this theorem with reference to an appropriate electric circuit. (8)

   b) Using nodal analysis, determine the node voltage. V_A and V_B in the circuit shown in Fig. 3. (8)

Fig 3

Unit - II

2. a) For a single phase sinusoidal waveform find the RMS value in terms of maximum value, Determine the form factor of sine wave. (8)

   b) Find the angle by which i_2 lags i_1 if

   $i_1 = 120\,Cos(100\pi t - 30^0)$ and

   i) $i_2 = -8\,Cos(100\pi t + 20^0)$

   ii) $i_2 = 5\,Sin(100\pi t + 50^0)$

   iii) $i_2 = -6\,Sin(100\pi t - 30^0)$ (8)

OR

2. a) Find the r.m.s and average value of wave form in fig. 4 (8)
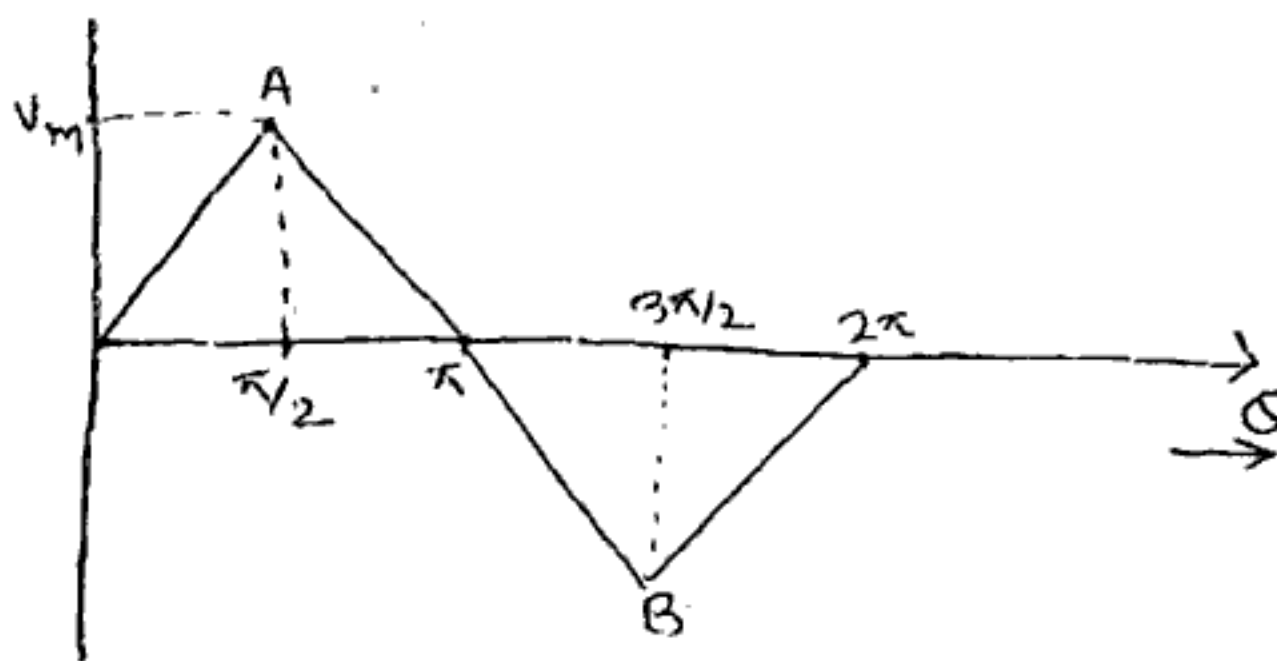

Fig. 4

1E2005   (2)

b) For a 3φ system, determine the relation between line and phase quantities in delta connection. Also draw the phasor diagram and find the relation for power. **(8)**

Unit - III

3. a) Describe the principle of operation of 3-phase synchronous generator. **(8)**
   b) Explain the principle of D.C. machines and construction of D.C. machine. **(8)**

OR

3. a) Explain the principal and working of 3-phase induction motor and explain type of 3- phase induction motor. **(8)**
   b) A 8 pole DC machine has a wave winding containing 600 conductors. Calculate the generated emf. When the flux per pole is 0.08 wb and speed is 215 rpm. If the flux per pole is made 0.05 wb. At what speed should the armature be driven to generate 500 V. **(8)**

Unit - IV

4. a) Sketch and explain the input and output characteristic curve for common emitter configuration. **(8)**
   b) Show how the zener diode can act like a voltage regulator. Also differentiate Avalance breakdown and zener breakdown. **(8)**

OR

4. a) i) Define α and β of a transistor. Derive the relationship between them. **(4)**
      ii) What do you mean by
         a) Active region
         b) Cut off region.
         c) Saturation region **(4)**
   b) Realize the Ex-OR and Ex-NOR gates by using only NAND gates and only NOR gates. **(8)**

Unit - V

5. a) What is Communication system. Explain with block diagram in detail. **(8)**
   b) What is the need of modulation? Compare the different types of modulation techniques. **(8)**

OR

5. a) Explain strain gauge transducer and drive its gauge factor **(8)**
   b) Write short note on
      i) Thermocouple **(4)**
      ii) RTD **(4)**

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