

1E2005

Roll No. _____

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B. Tech I Sem. (Main/Back) Exam. Jan. 2016
105 Basic Electrical & Electronics Engineering
Common to all Branch

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks: 24

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.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Find the current in branch AB in the unbalanced bridge using noble analysis, as shown in Fig 1.1(a) [8]

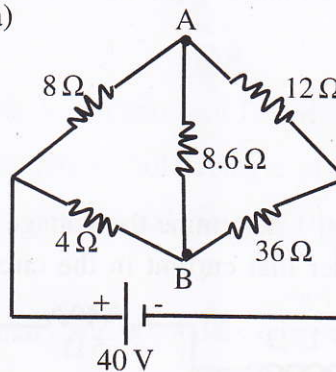
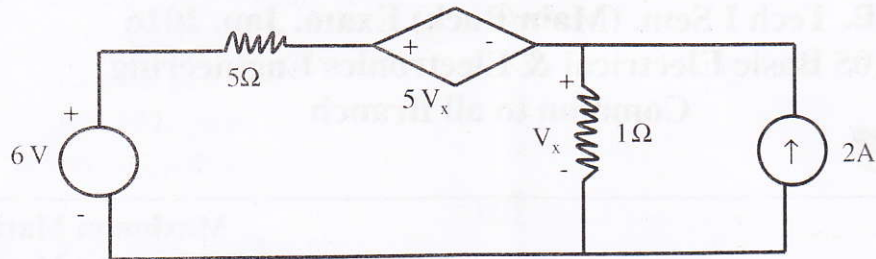


fig 1.1(a)

- (b) State and explain Thevenin's theorem with suitable example. [8]

OR

Q.1 (a) Find current in 5Ω resistance using superposition theorem in Fig 1.1 (b) [8]



(b) Find the values of unknown currents I_1 , I_2 , I_3 and unknown resistances R_1 and R_2 , as shown in Fig 1.(b) [8]

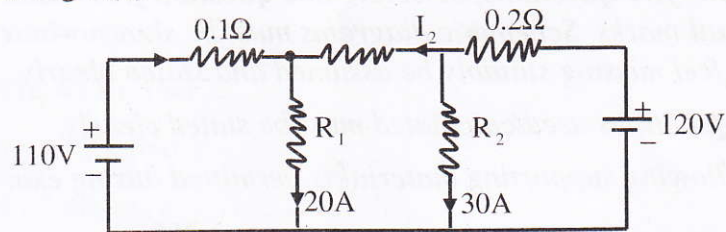


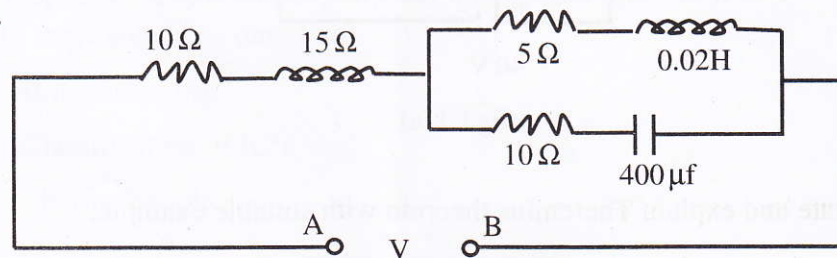
fig 1(b)

UNIT-II

Q.2 (a) Define the following with suitable diagram: [6]

- (i) RMS values
- (ii) Form factor
- (iii) Peak factor
- (iv) Phase angle

(b) In the act shown in fig (2). 1 determine the voltage at a frequency of 50Hz to be applied across AB in order that current in the circuit is 10A. Draw the phases dia. [10]



OR

Q.2 (a) Three sinusoidal voltages acting in series are given by:

$$V_1 = 10 \sin 440 t$$

$$V_2 = 10\sqrt{2} \sin (440 t - 45^\circ)$$

$$V_3 = 20 \cos 440 t$$

find :

- (a) The expression for resultant voltage
- (b) frequency and RMS value of resultant voltage [8]
- (b) How power can be measured using two wattmeter method for balance load?

Derive an expression – $\tan \phi = \sqrt{3} \frac{(w_1 - w_2)}{(w_1 + w_2)}$ [8]

UNIT-III

- Q.3 (a) Derive the EMF equation for a single phase transformer and deduce the expression for transformation ratio. [6+2=8]
- (b) Explain the principle of operation of 3- phase induction motor. [8]

OR

- Q.3 (a) Explain in detail the Applications of DC Machines. [8]
- (b) A 200 KVA, 6600/400 v, 50Hz single phase transformer has 80 turns on the secondary and cross sectional area of the core is 80sq.cm. Neglect losses, calculate: [8]
- (i) Full load primary and secondary current
 - (ii) The no. of primary turns
 - (iii) Peak flux density
 - (iv) Maximum flux value in the core

UNIT-IV

- Q.4 (a) Explain the working of a transistor as an amplifier. [8]
(b) Explain the following gates: [8]
 (i) AND gate
 (ii) OR gate
 (iii) NOT gate
 (iv) EX-OR gate

OR

- Q.4 (a) Write short on (any one) [8]
 (i) Photovoltaic cell
 (ii) Rectifiers
(b) Solve the following: - [8]
 (i) $(1057)_{10} = (X)_2$ find X
 (ii) $(375)_{10} = (Y)_8$ find Y
 (iii) $(11011.110)_2 = (Z)_{10}$ find Z

UNIT-V

- Q.5 (a) Derive the mathematical expression of modulation index for frequency modulated wave. Compare FM with AM [6+2=8]
(b) Write short on: - [8]
 (i) RTD
 (ii) Strain Gauges

OR

- Q.5 (a) A sinusoidal carrier wave of frequency 2 MHz and amplitude 20mv is amplitude modulated by a sinusoidal wave of frequency 5 KHz. Determine the frequency and amplitude of side bands. Consider modulation index as 0.8. [8]
(b) Write short note on: - (any one) [8]
 (i) Bimetallic strip
 (ii) Classification of IC's
 (iii) Thermo couple