Code: 15A99301

R15

B.Tech II Year I Semester (R15) Regular & Supplementary Examinations November/December 2017

BASIC ELECTRICAL & ELECTRONICS ENGINEERING

(Common to CSE & IT)

Time: 3 hours Max. Marks: 70

Answer all the questions
(Use single answer booklet only)
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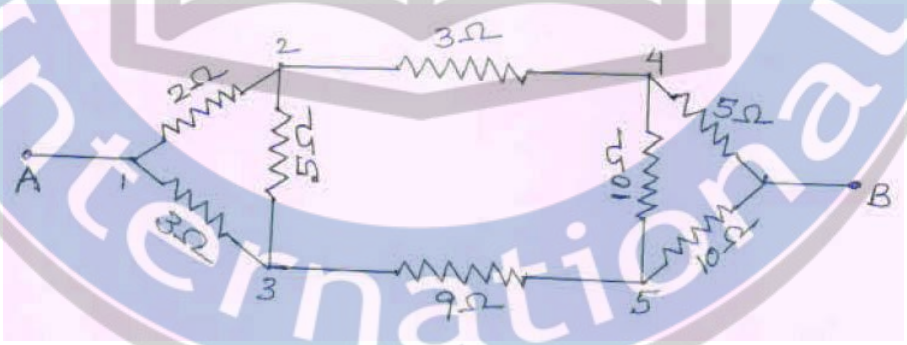
PART – A

UNIT – I

1 (a) State Kirchhoff's current law and Kirchhoff's voltage law.

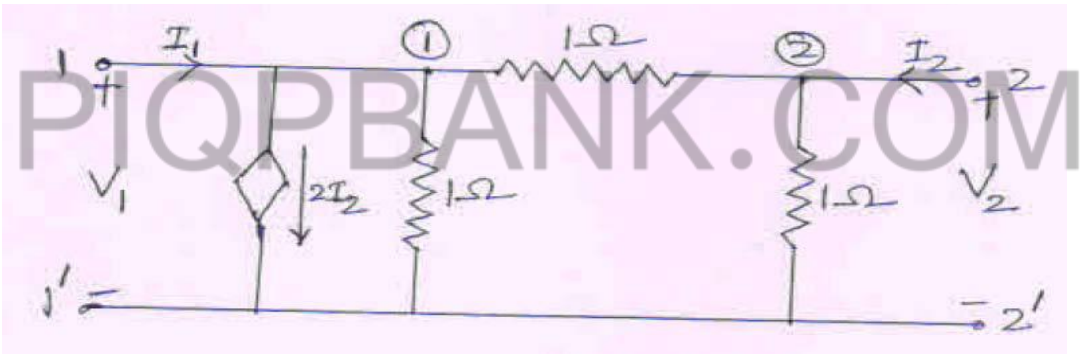
(b) Find the voltage to be applied across AB in order to drive a current of 5 A into the circuit shown in figure below. Use Star-Delta transformation.



OR

2 (a) Express z-parameters in terms of y-parameters.

(b) For the network shown in figure below, determine admittance parameters.



UNIT – II

3 (a) Explain the constructional features of a DC machine with neat sketch.

(b) A 4-pole DC generator has an armature with 60 slots, each carrying 24 lap connected conductors. If the machine runs at 1000 r.p.m and generates 432 V, what is the useful flux per pole? If the armature is wave connected, other condition remaining same, what would be the emf generated?

OR

4 (a) Derive an expression for torque developed in a DC motor.

(b) A 440 V shunt motor takes 105 A (armature current) from the supply and runs at 1000 r.p.m. Its armature resistance is 0.15Ω. If total torque developed is unchanged, calculate the speed and armature current if the magnetic field is reduced to 70% of the initial value.

Contd. in page 2

UNIT – III

5 (a) Deduce the EMF equation of a single phase transformer.

(b) A 500 KVA, 11000 V/400 V, 50 Hz, single phase transformer has 100 turns on the secondary winding. Calculate: (i) The approximate number of turns in the primary winding. (ii) The approximate value of the primary and secondary currents. (iii) The maximum value of flux in the core.

OR

6 (a) Draw and explain Torque-slip characteristics of a 3-phase induction motor.

(b) A 20 HP, 4-poles, 50 Hz, 3-phase induction motor has friction and windage losses of 3% of the output. For full load slip of 4%, calculate the full load: (i) Rotor copper losses. (ii) Rotor input. (iii) Output torque.

PART – B

UNIT – I

7 Discuss about PN junction diode forward bias and reverse bias condition with necessary diagram.

OR

8 Explain the working of half wave rectifier and full wave rectifier with necessary diagram.

UNIT – II

9 Draw and explain the CC configuration of BJT and determine its current gain. Also express the relation between I_B, I_C and I_E.

OR

10 Explain the operation of enhancement and depletion MOSFET with diagram.

UNIT – III

11 Explain the operation of RC phase shift oscillator circuit and express the condition for sustained oscillation.

OR

12 Show that operational amplifier circuit performs the mathematical operation of differentiation and illustrate with diagram. Write down the expression for output voltage of the differentiator amplifier.

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