No. of Printed Pages : 4

BIEE-033

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

00521

Term-End Examination

June, 2014

BIEE-033 : ELECTRICAL CIRCUIT THEORY

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks.*

1. (a) Explain the difference between *6*

(i) dc voltage and ac voltage

(ii) Thevenin's equivalent and Norton's equivalent

(iii) Unilateral and Bilateral element

(b) State and explain Ohm's law. What are the limitation of Ohm's Law ? *4*

(c) Determine the resistance between the terminals a-b in the network shown in Fig. 1. *4*

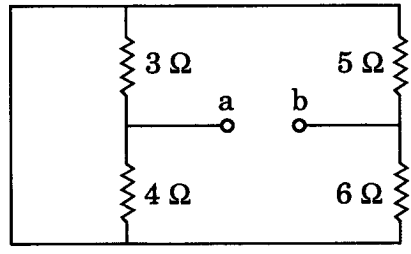

Fig. 1

2. (a) Find the input resistance at AB for the lattice network shown in Fig. 2 when terminals CD are

(i) open circuited.

(ii) short circuited. *7*

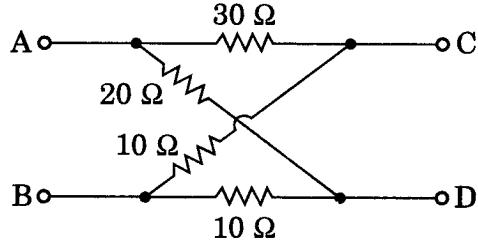

Fig. 2

(b) Convert the Π-network to its T-equivalent as shown in Fig. 3. *7*

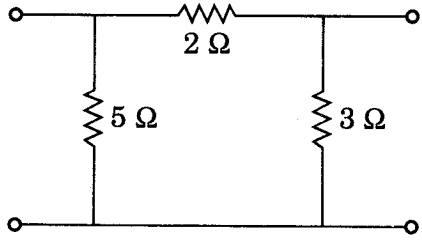

Fig. 3

3. (a) State and prove the maximum power transfer theorem. *7*

(b) State Superposition theorem and explain it with a suitable example. *7*

4. (a) Which method is more suitable to solve a particular circuit, Mesh analysis or Nodal Analysis and why ? *4*

(b) Determine the current through 5 Ω resistor in Fig. 4 using both Thevenin's and Norton's Theorem. *10*

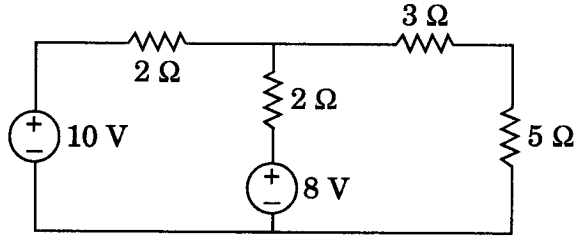

Fig. 4

5. Find rms and average value of half wave rectifier wave output. Also find out rectification efficiency and ripple factor for the above case. *14*

6. (a) A series RLC circuit has R = 10 Ω, L = 0·1 H and C = 8 μF. Determine

(i) the resonant frequency

(ii) Q-factor of the circuit at resonance

(iii) the half-power frequency *7*

(b) Draw the tank circuit and determine the expression of dynamic impedance Z_0 and resonant frequency ω_0. *7*

7. (a) Find equivalent resistance across a – b terminal of network shown in Fig. 5. *7*

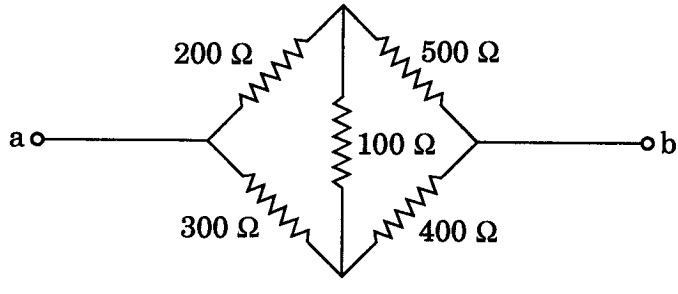

Fig. 5

(b) In the network shown in Fig. 6, determine

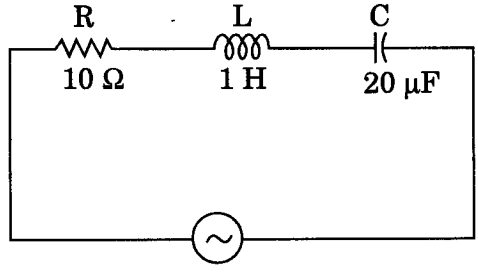

Fig. 6

(i) total impedance

(ii) total current

(iii) current in each branch

(iv) overall power factor

(v) volt-ampere

(vi) active power

(vii) reactive volt-ampere 7

8. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Reactive power in purely inductive circuit

(b) Power factor improvement

(c) Star-Delta Transformation

(d) Voltage Magnification

(e) Variation of Z, X_L, X_C, R, cos ϕ, I with respect to f