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No. of Printed Pages : 4

BIEE-033

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

December, 2015

BIEE-033 : ELECTRICAL CIRCUIT THEORY

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Question no. **1** is **compulsory**. All questions carry equal marks. Use of scientific calculator is allowed. Assume missing data, if any.*

1. Select the correct alternative. *7×2=14*

(a) Kirchhoff's law is applicable to

(i) AC circuits only

(ii) DC circuits only

(iii) AC as well as DC circuits

(iv) Passive networks only

(b) Power factor of pure inductor is

(i) unity

(ii) zero

(iii) infinite

(iv) 0·707 lagging

(c) A close path made by several branches of the network is known as

(i) circuit

(ii) branch

(iii) junction

(iv) loop

(d) Power factor of a series resonating circuit is

(i) unity

(ii) zero

(iii) 0·707 lagging

(iv) 0·707 leading

(e) As per maximum power transfer theorem, the internal resistance of a circuit should be equal to _____ for maximum power transfer to load.

(i) cell resistance

(ii) load resistance

(iii) load inductance

(iv) load capacitance

(f) In a circuit, the current is $10\angle -30°$ amp. Nature of the current is

(i) leading

(ii) lagging

(iii) in phase with voltage

(iv) All of the above

(g) Resistance of a 100 watt 200 volt lamp is

(i) 100 Ω

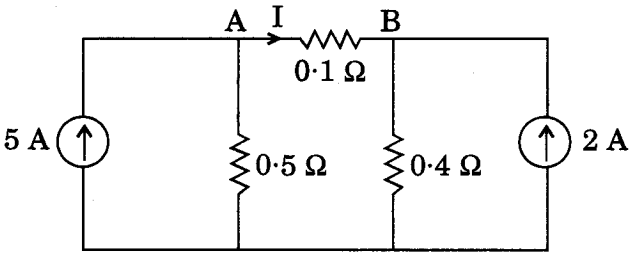
(ii) 200 Ω

(iii) 400 Ω

(iv) 1600 Ω

2. (a) State and explain Kirchhoff's voltage law with the help of an example. 7

(b) Find out the current (I) through the 0·1 Ω resistor, using Thevenin's theorem. 7



3. (a) State and explain nodal analysis with the help of a suitable example. 7

(b) State, prove and explain maximum power transfer theorem. 7

4. (a) State the condition of series resonance. Also define and derive the Quality factor of a series resonant circuit. 2+5

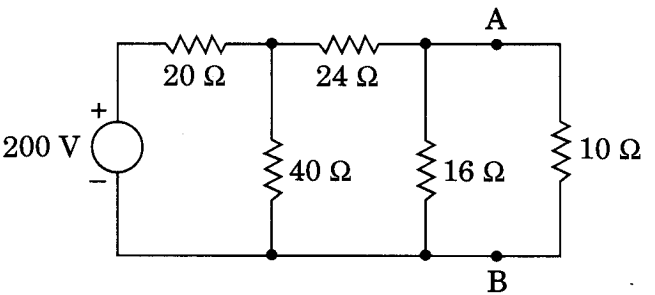
(b) A coil of resistance 100 Ω and inductance 100 mH is connected in series with a 100 pF capacitor. The circuit is connected to a 10 volt variable frequency source. Calculate (i) the resonant frequency, (ii) the current at resonance, and (iii) Q-factor of the circuit. 7

5. (a) Explain power triangle and impedance triangle. Also give the formula and units of real, imaginary and apparent power in case of an a.c. circuit. *2+2+3*

(b) A resistance of 20 Ω is in series with an inductance of 0·1 henry with the terminal voltage of 230 volt 50 Hz. Find the value of current. Also calculate the phase angle between voltage and current. *7*

6. (a) State and explain Superposition theorem with the help of suitable diagrams. *7*

(b) Using Norton's theorem, determine the current in the 10 Ω resistor of the given network. *7*



7. Write short notes on any ***two*** of the following : *2×7=14*

(a) Delta Star Transformation

(b) Nodal Analysis

(c) Parallel Resonance

(d) Duality and Dual Networks