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**C09–EC–306**

# 3238

## BOARD DIPLOMA EXAMINATION, (C–09)

## APRIL/MAY—2015

## DECE—THIRD SEMESTER EXAMINATION

CIRCUIT THEORY

*Time* : 3 hours ] [ *Total Marks* : 80

**PART—A** 3×10=30

***Instructions*** : (1) Answer **all** questions.

(2) Each question carries **three** marks.

(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

**1.** Distinguish between DC and AC.

**2.** Explain phase difference briefly.

**3.** Distinguish between series and parallel resonance circuits.

**4.** Define the following terms :

*(a)* Branch

*(b)* Loop

*(c)* Mesh

**5.** Define the driving point impedance and transfer impedance of a network.

**6.** Write the advantages of maximum power transfer theorem.

**7.** State the superposition theorem.

**8.** Define the time constant of an *R-C* circuit.

**9.** Explain dot convention used in coupled circuits.

**10.** Draw the high-pass *R-C* circuit and low-pass *R-C* circuit.

## PART—B

10×5=50

***Instructions*** : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

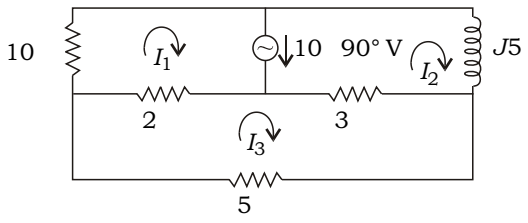
**11.** *(a)* A sinusoidal voltage $V(t)$ $200\sin 1000t$ is applied across a pure capacitor of 100 microfarads. Find current and charge. 5

*(b)* Derive the expressions for current and power of a pure resistor circuit with a.c. source. 5

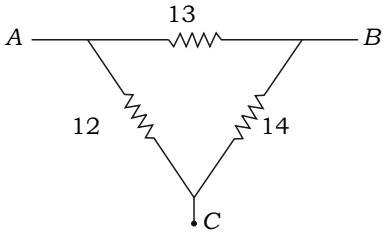
**12.** *(a)* Explain *V-I* characteristic of series *R-L-C* circuit with a.c. source. 6

*(b)* Derive the expression of resonant frequency of the series *R-L-C* circuit. 4

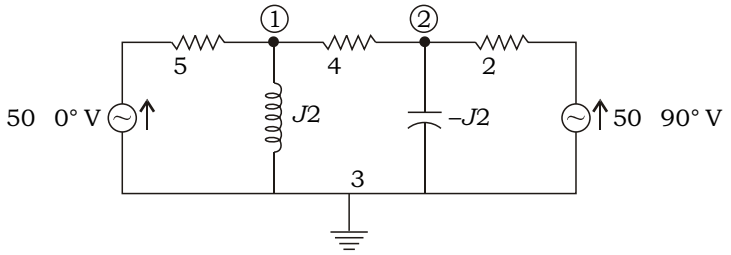
**13.** *(a)* For the following circuit, find the current in the 5 ohm resistor : 6



(b) Obtain the star-equivalent circuit for the delta-connected circuit shown below : 4

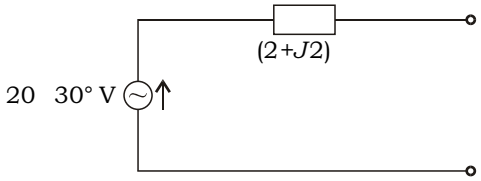



**14.** (a) Determine the voltage of nodes 1 and 2 in the network shown below : 6

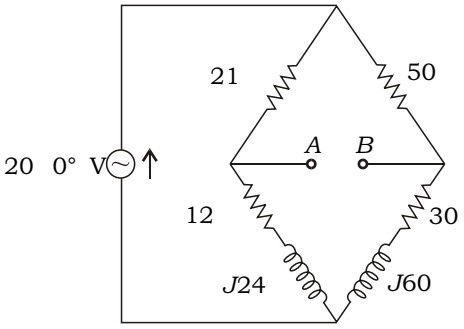



(b) Write the limitations of Ohm's law. 4

**15.** (a) Convert the given voltage source into equivalent current source : 4

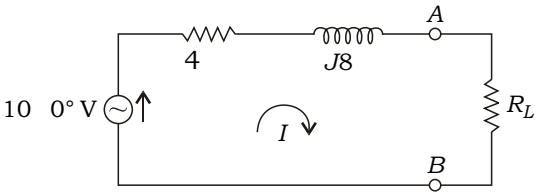



(b) Obtain the Thevenin's equivalent circuit for the bridge circuit shown below : 6



**16.** *(a)* State the reciprocity theorem and give the limitations. 5

*(b)* Find the value of load resistance for which the source delivers maximum power to it and also find the maximum power transferred : 5




**17.** *(a)* Explain how a low-pass *R-C* circuit works as an integrator. 5

*(b)* Explain the reflected impedance significance in coupled circuit and give the expression for the reflected impedance. 5

**18.** *(a)* Explain the response of a high-pass *R-C* circuit for pulse input. 5

*(b)* Mention the applications of integrator and differentiator circuits. 5

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