* 3 2 3 8 *

C09–EC–306

3238

BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2015
DECE—THIRD SEMESTER EXAMINATION
CIRCUIT THEORY

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

PART—A 3×10=30

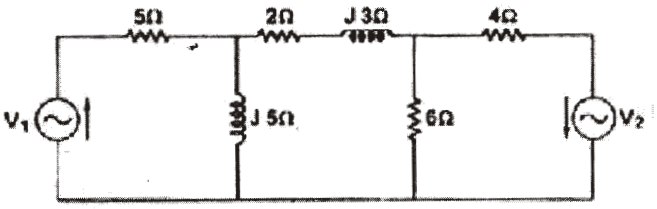
Instructions : (1) Answer **all** questions.
(2) Each question carries **three** marks.
(3) Answers should be brief and straight to the point and shall not exceed *five* simple sentences.

1. A coil has an inductance of 1 H. If the current flowing through it changes at the rate of 2A/s, what would be the voltage induced in the coil?

2. List the applications of resonance.

3. Distinguish between DC and AC.

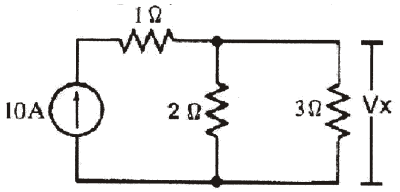
4. Determine the number of mesh equations required to solve the network shown below :



5. Define *(a)* driving point impedance and *(b)* transfer impedance.

6. What is the equivalent current source for a voltage source of 12 V in series with 6 resistance?

7. Verify the reciprocity theorem in the circuit shown in figure below :



8. Mention the uses of differentiator and integrator circuits.

9. Two coupled coils with L_1 0 02 H, L_2 0 01 H and k 0 5 are connected in series opposing. Find their equivalent inductance.

10. When does double humps formed in the frequency response of a double tuned circuit?

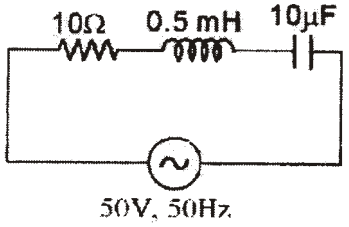
PART—B 10×5=50

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

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

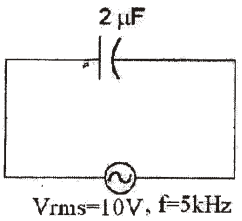
(3) Answers should be comprehensive and the criterion for valuation is the content but not the length of the answer.

11. In the circuit shown below, determine the total impedance, current I, phase angle and the voltage across each element :

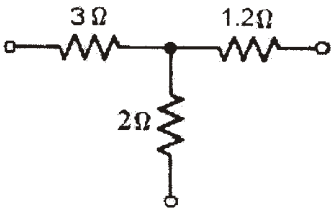


12. *(a)* Explain the V-I characteristic of pure capacitor with a.c. source.

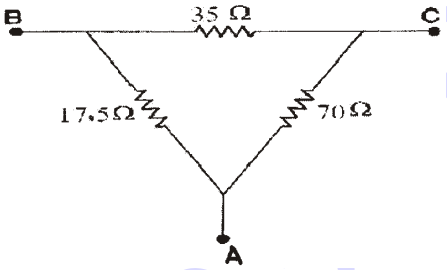
(b) Determine the r.m.s. current in the circuit shown below :



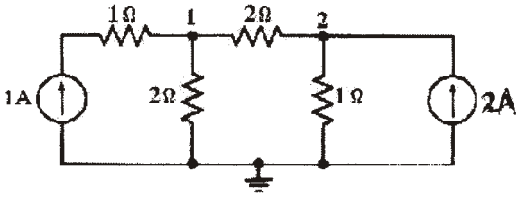
13. *(a)* Convert the star network shown in figure below to an equivalent delta network :



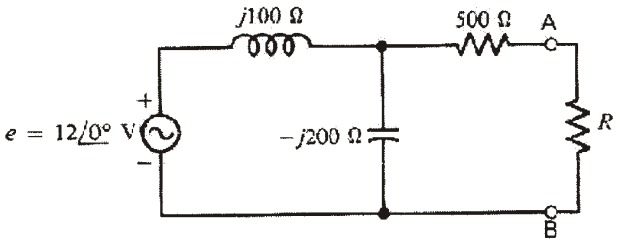
(b) Obtain the star equivalent circuit for the delta connected circuit shown in figure below :



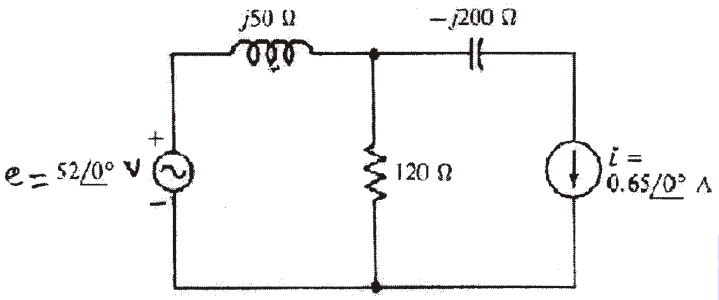
14. Determine the voltages at nodes 1 and 2 of the network shown by using nodal analysis :



15. Find the Thevenin's equivalent of the circuit lying to the left of terminals A-B in the figure shown below :



16. Using superposition theorem, find the polar form of the current through the 120 resistor shown in the figure :



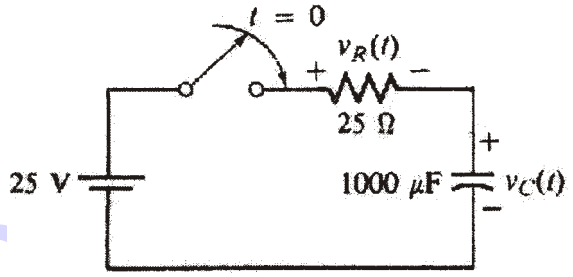
17. *(a)* Explain how a low pass R-C circuit acts as an integrator.

(b) Explain how a high pass R-C circuit acts as a differentiator.

18. For the circuit shown in the figure below—

(a) write the mathematical expression for the voltage $V_c(t)$ and $V_R(t)$ after the switch is closed at t 0;

(b) find the values of $V_c(t)$ and $V_R(t)$ at t 0 6 sec.



★ ★ ★