ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Mid-Semester Examination   Summer Semester, A.Y. 2015-2016
Course No.: Phy 4241   Time: 90 Minutes
Course Title: Physics II   Full Marks: 75

There are 4 (four) questions. Answer any 3 (three) questions. All questions carry equal marks. Marks in the margin indicate full marks. Programmable calculators are not allowed. Do not write on this question paper.

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1. a) Find the equivalent resistance with respect to terminals A and B in the circuit of   15
        Fig. 1(a). Assume all the resistance values are equal to 1 kΩ.
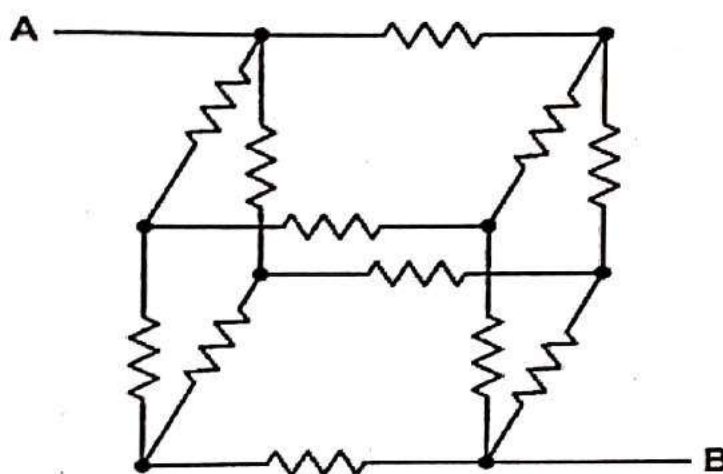

Fig. 1(a)

    b) Assume a current of 3 ampere in entering through the terminal A in the circuit of   10
        Fig. 1(a). Now determine all the branch currents and show them in a diagram.

2. a) Calculate the value of I_1 from the circuit in Fig. 2(a).   15
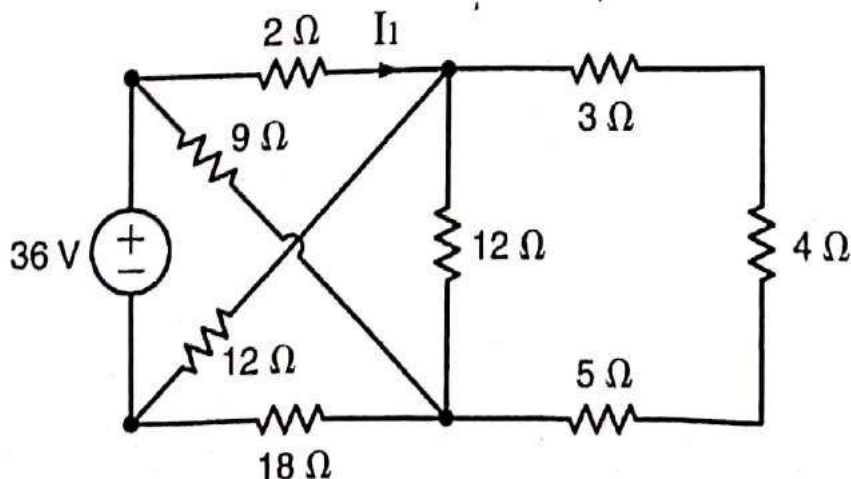

Fig. 2(a)

    b) State the maximum power transfer theorem. For a circuit with ideal source, derive   10
        the condition for maximum power transfer with power vs. load graph.

3. a) Use mesh analysis to obtain i_0 in the circuit of Fig. 3(a).
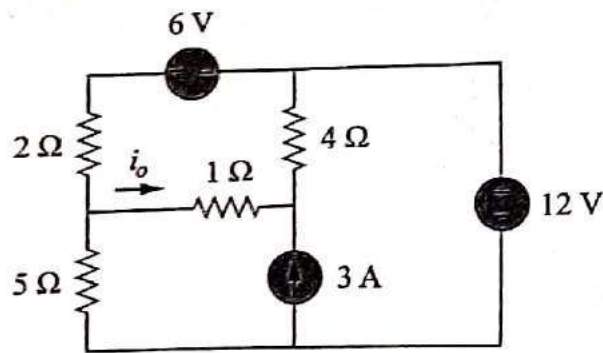
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6 V

2 Ω i_0 1 Ω 4 Ω

12 V

5 Ω 3 A

Fig. 3(a)

b) Derive the equations to convert a delta connected resistance network to an equivalent wye connected resistance network and vice-versa.

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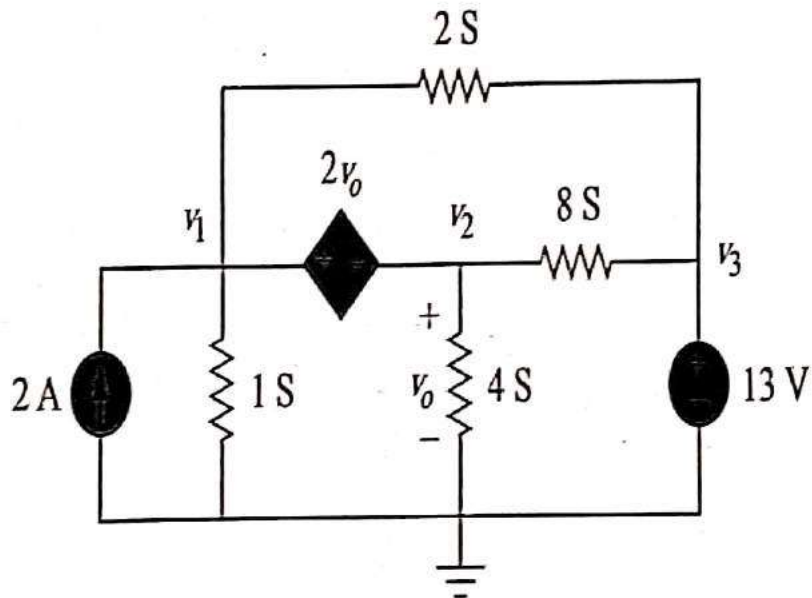4. a) Find out all the node voltages in the circuit of Fig. 4(a).

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2 S

$2V_0$

V_1 V_2 8 S V_3

2 A 1 S V_0 4 S 13 V

Fig. 4(a)

b) Determine the value of R_L when maximum power is transferred in R_L in the circuit of Fig. 4(b). What is the maximum power?
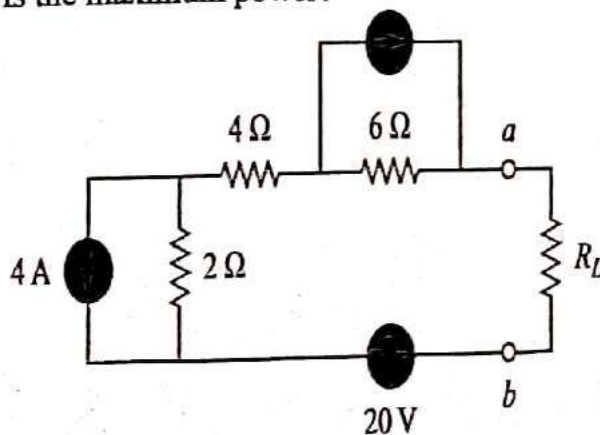
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4 Ω 6 Ω a

4 A 2 Ω R_L

20 V b

Fig. 4(b)