Q.5	i.	Define Zener diode and its application also draw its equivlent circuit.	**2**
	ii.	What is basic difference between BJT, MOSFET and JFET	**3**
	iii.	Define α and β of a transistor and derive the relationship between them.	**5**
OR	iv	Explain full wave diode rectifier with Circuit diagram, input-output waveform and efficiency.	**5**
Q.6	i.	Connvert these number as given. (a) $(365.24)_8$ = ( )$_{10}$ (b) $(68.4B)_{16}$ = ( )$_8$	**2**
	ii.	Define Flip-Flop also draw the block diagram and truth table of basic SR flip flop.	**3**
	iii.	Explain full adder with truth table, boolean expression and block diagram.	**5**
OR	iv.	Drive the basic gates (AND, OR & NOT) using universal NAND and NOR gate.	**5**

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Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2017

EN3ES04 Basic Electrical and Electronics Engineering

Programme: B.Tech. Branch/Specialisation: All

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1	i.	A network which does not have either voltage sources or current sources is called. (a) Active network (b) Passive network (c) Resistive network (d) Dummy network	**1**
	ii.	What will be the current passing through the ring shaped air cored coil when number of turns is 800 and ampere-turn are 3200 (a) 0.25 (b) 2.5 (c) 4.0 (d) 0.4	**1**
	iii.	The power factor at the time of resonance is (a) Lagging (b) Leading (c) Unity (d) Zero	**1**
	iv.	When the power transfered to the load is maximum, the efficiency of power transfer is. (a) 25% (b) 75% (c) 50% (d) 100%	**1**
	v.	In ideal transformer the no load current lags behind the applied voltage by an angle of (a) 90 degree (b) 180 degree (c) 120 degree (d) 0 degree	**1**
	vi.	Which losses are load dependent losses in transformer (a) Core loss (b) Copper loss (c) Iron loss (d) All of these	**1**
	vii.	When a pn junction if reverse biased (a) The width of deplation layer increase (b) It offers a high resistance (c) A amall current flows through it because of minority carriers (d) All of thease	**1**

viii. Which of the following is valid for both P-N-P as well as N-P-N transistors. **1**

(a) The emitter injects holes into the base region
(b) The electron are the minority carriers in base region
(c) The EB is forward biased for active operation
(d) When biased in active region, current flows into emitter terminal.

ix. 1's complement subtraction of (11010 – 1101) will be **1**

(a) 1101 (b) 1011 (c) 1100 (d) None of these

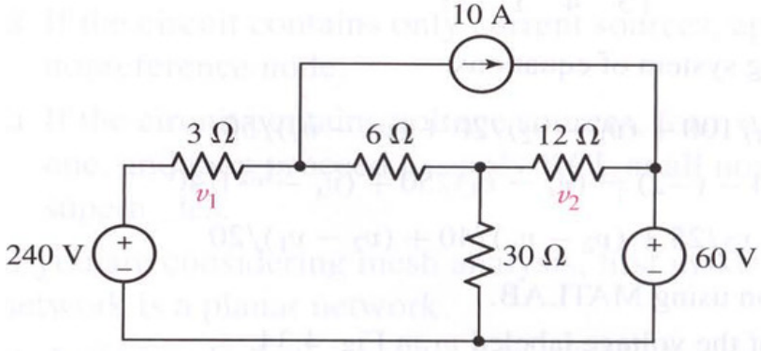
x. Addition of $(634)_8 + (152)_8$ will be **1**

(a) 1006 (b) 886 (c) 582 (d) None of these

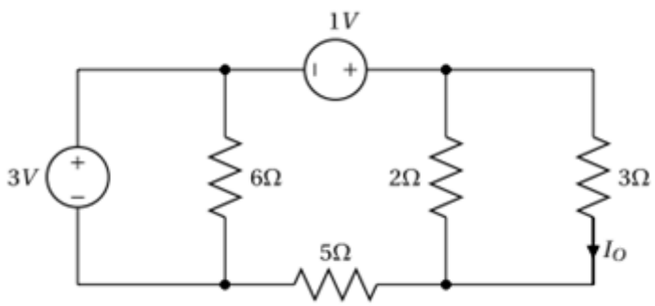
Q.2 i. Define the term Ideal and Practical voltage and current sources. **2**

ii. Compare the electrical and magnetic circuit with any four similarities and any two dissimilarity. **3**

iii. Find V_1 and V_2 using nodal analysis. **5**

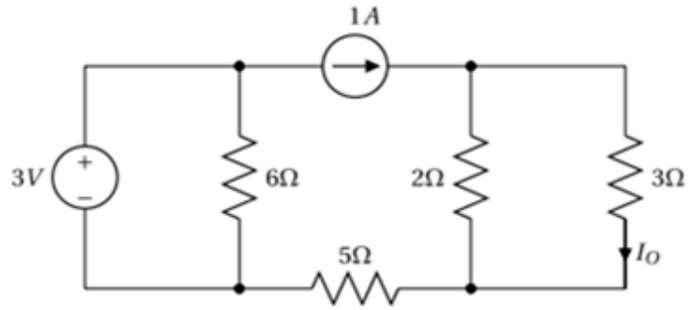


OR iv. Find I_o (current through 3 ohm resistance) using Mesh analysis. **5**



Q.3 i. Define the maximum power transfer theorem and formulate the maximum power transfered. **2**

ii. Find I_o (current through 3 ohm resistance) using thevenin **or** Norton theorem. **3**



iii. Two circuit , the impedance of which are given by $Z_1 = (10 + j15)$ ohm and $Z_2 = (6 - j8)$ ohm are connected in parallel. If the total current supplied is 15 Amp, what is power taken by each branch. Draw the phasor diagram also. **5**

OR iv Achoke coil has a resistance of 2 ohm and a inductance of 5 H. A capacitor C is connected in series with a choke coil and the combination is fed from from 230 volt,50 Hz source. what should be the value of C so that the voltage across the capacitor is 250 volts. **5**

Q.4 i. Define the efficiency and voltage regulation of transformer with formula. **2**

ii. How three phase induction motor run and why it is called a asynchronous motor. **3**

iii. Obtain approximate equivalent circuit of a given 200/2000 V, 50 Hz single phase 30 KVA transformer having the following test result. **5**
O.C. Test: 200 V, 6.2 A, 360 W on l.v. side
S.C. Test: 75 V, 18 A, 600 W on h.v. side

OR iv Draw the phasor diagram of transformer with (a) No load condition (b) lagging power factor also write the proccedure for drawing the phasor. **5**

EN3ES04 Basic Electrical and Electronics Engineering

Marking Scheme

Q.1 i. A network which does not have either voltage sources or current sources is called **1**
(b) passive network

ii. What will be the current passing through the ring shaped air cored coil when number of turns is 800 and ampere-turn are 3200 **1**
(c) 4.0

iii. The power factor at the time of resonance is **1**
(c) Unity

iv. When the power transfered to the load is maximum, the efficiency of power transfer is **1**
(c) 50%

v. In ideal transformer the no load current lags behind the applied voltage by an angle of **1**
(a) 90 degree

vi. Which losses are load dependent losses in transformer **1**
(b) Copper loss

vii. When a pn junction if reverse biased **1**
(d) All of these

viii. Which of the following is valid for both P-N-P as well as N-P-N transistors. **1**
(c) The EB is forward biased for active operation

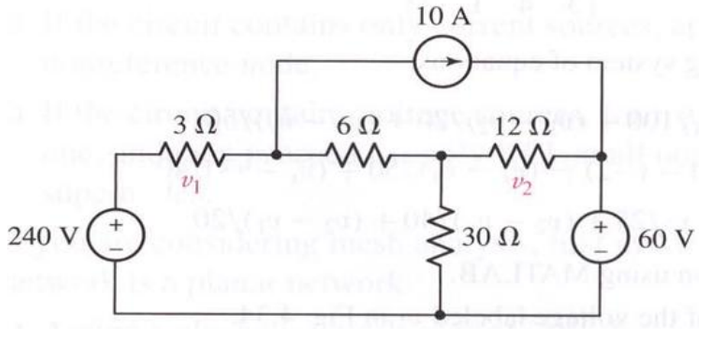
ix. 1's complement subtraction of (11010 – 1101) will be **1**
(a) 1101

x. Addition of $(634)_8 + (152)_8$ will be **1**
(a) 1006

Q.2 i. 1 marks for each definitation (1 * 2 = 2 marks) **2**

ii. 2 marks for any 4 similarities **3**
1 marks for any 2 disimilarities

iii. **5**

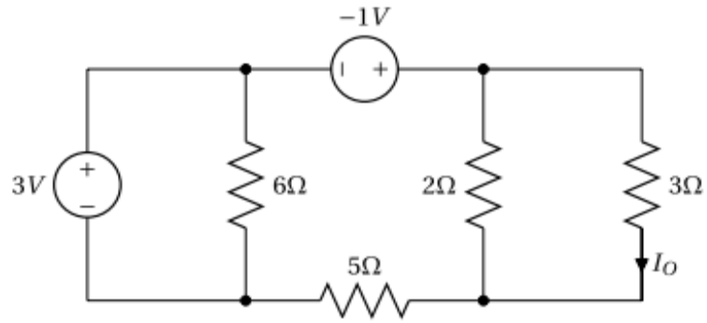


2 marks for nodal equation
3Va – Vb = 420.....(1) node a
-10Va + 17Vb = 300.....(2) node b

2 marks for nodal voltage
Va = 7440/41 = 181.46 volt
Vb = 5100/41 = 124.39 volt

1 marks for desired voltage (v_1&v_2)
V_1 = 58.54 volt and V_2= 64.39

OR iv. **5**



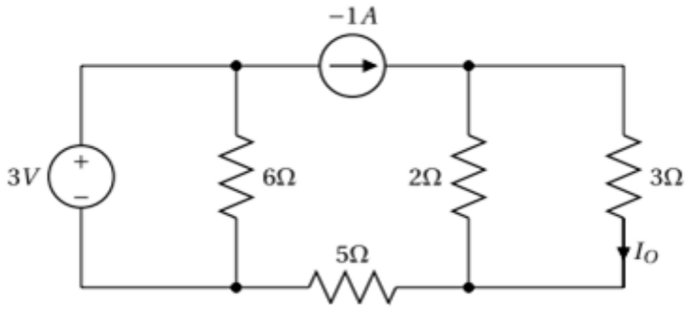
2 marks for loop equation
$-6I_1 + 6I_2 = -3$ .....(1) loop 1
$-6I_1 + 13I_2 - 2I_3 = 1$.....(2) loop 2
$2I_2 – 5I_3 = 0$.....(3) loop3

2 marks for loop current
$I_1 = 71/62 = 0.822$, $I_2 = 20/31 = 0.645$, $I_3 = 8/31 = 0.258$

1 marks for desire current (I_0)
$I_0 = 0.258$ amp

Q.3 i. 1 marks for defination **2**
1 marks for formula

ii. 1 marks for thevenin voltage **3**
Vth = 1*2= 2 volt
1 marks for thevenin resistance
Rth = 2 ohm
1 marks for load current
$I_L = I_0 = 2/(2+3) = -2/5 = 0.4$ amp



iii. **Solution:** Z1=10+j15 =18∠56.3 **5**

Z2=6-j8 =10∠-53.13

Z1+Z2 = 16+j7 = 17.46∠23.63

Branch Current, $I_1 = I * Z1/(Z1+Z2)$

$= 8.89\angle -76.76$

Branch Current, $I_2 = I * Z2/(Z1+Z2)$

$= 15.46\angle 32.6$

2 marks for I_1 & I_2 in each branch

Power taken by first branch P1 = I^2R = 737.88 watt

Power taken by second branch P2 = I^2R = 1434 watt

2 marks for P_1 & P_2 in each branch

1 mark for phasor diagram

OR iv Solution**:** **5**

R= 2ohm, L=5H, Xl= 2Πfl=1570 ohm

Vc=IXc=250 ,and I=V/Z

Xc=817.7

C=3.89 microfarad

1 marks for inductive reactance

2 marks for current equation

2 marks for capacitance value

Q.4 i. 1 marks for each definition **2**

ii. 1.5 marks for each part (1.5 * 2 = 3 marks) **3**

iii. Solution**:** **5**

2 marks for core parameter

OC Test:

Iw = 1.8 A, Im = 5.93 A, Re = 111.11 ohm, Xm = 33.7 ohm

2 marks for winding parameter

SC Test:

Req = 1.85 ohm, Zeq = 4.167ohm,

Reffered to lv side Z01 = 0.04167 ohm, R01 = 0.0185 ohm, X01 = 0.0373 ohm

1 marks for equilavent circuit diagram

OR iv 2 marks for part a **5**

2 marks for part b

1 marks for proccedure.

Q.5 i. 1 marks for definition and application **2**

1 marks for equivalent

ii. 1 marks for each basic difference between them. (1 * 3 = 3 marks) **3**

iii. 2 marks for definition **5**

3 marks for derivation for relationship

OR iv 2 marks for circuit diagram **5**

1 marks for waveform

2 marks for efficiency derivation

Q.6 i. Connvert these number as given. **2**

(a) $(365.24)_8 = (245.3125)_{10}$

(b) $(68.4B)_{16} = (150.226)_8$

1 marks for each part (1 * 2 = 2 marks)

ii. 1 marks for defination **3**

1 marks for block diagram

1 marks for truth table

iii. 1 marks for truth table **5**

2 marks for boolean expression

2 marks for block diagram

OR iv. 2.5 marks for NAND gate **5**

2.5 marks for NOR gate

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