

Enrollment No.....



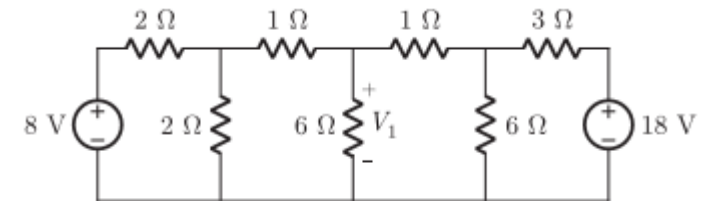
Faculty of Engineering
End Sem (Even) Examination May-2018
EN3ES04 Basic Electrical and Electronics Engineering
 Programme: B.Tech. Branch/Specialisation: All

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. In the following circuit the value of voltage V_1 is ____ Volts. **1**

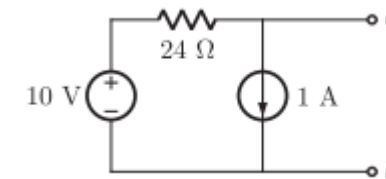


- (a) 4V (b) 6V (c) -5 (d) None of these

ii. Ideal value of internal impedance of current source is **1**

- (a) Zero (b) Infinite (c) Very high (d) Near to Zero

iii. For the circuit shown in the figure the Thevenin voltage and resistance seen from the terminal a-b are respectively **1**



- (a) 34 V, 0 (b) 20 V, 24 (c) 14 V, 0 (d) -14 V, 24

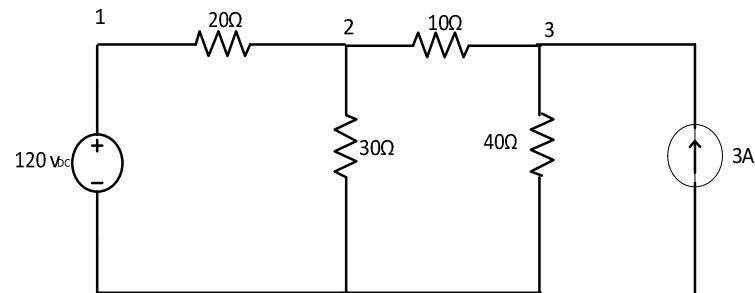
iv. For a network having resistors and independent sources, it is desired to obtain Thevenin equivalent across the load which is in parallel with an ideal current source. Then which of the following statement is true? **1**

- (a) The Thevenin equivalent circuit is simply that of a voltage source.
 (b) The Thevenin equivalent circuit consists of a voltage source and a series resistor.
 (c) The Thevenin equivalent circuit does not exist but the Norton equivalent does exist.
 (d) None of these

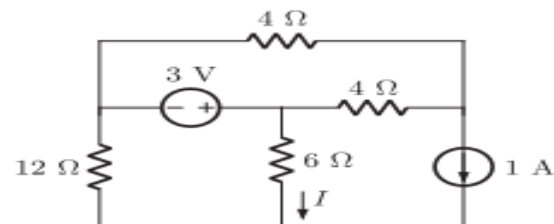
[2]

- v. Condition of maximum efficiency in transformer is **1**
 (a) Minimum core losses
 (b) Minimum copper losses
 (c) Copper losses equals to core losses
 (d) None of these
- vi. Disadvantage of autotransformer is/are **1**
 (a) No isolation between primary and secondary
 (b) Small in size
 (c) Variable output voltage
 (d) Both options (a) and (c)
- vii. Barrier voltage for germanium diode is **1**
 (a) 0.3V (b) 0.7V (c) 1V (d) None of these
- viii. PPIV across diode in bridge rectifier is equals to **1**
 (a) Output voltage (b) Two times of output voltage
 (c) Input voltage (d) None of the above.
- ix. Hexadecimal equivalent of decimal number 946 is **1**
 (a) 3C2 (b) 53D (c) 47A (d) 3B2
- x. Universal logic gate is/are----- **1**
 (a) XOR (b) NAND (c) OR (d) Both (a) and (b)

- Q.2 i. Explain Faraday's law of electromagnetic induction. **2**
 ii. Describe current division and voltage division rules. **3**
 iii. Use nodal analysis to obtain nodal voltages at node 1, 2 and 3 in given circuit. **5**

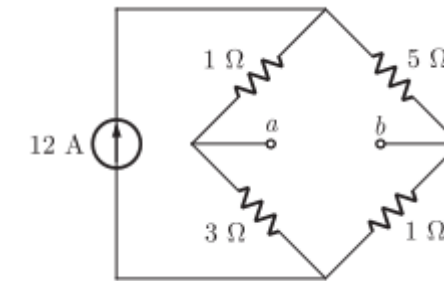


- OR iv. In given circuit, use mesh analysis to obtain current I. **5**

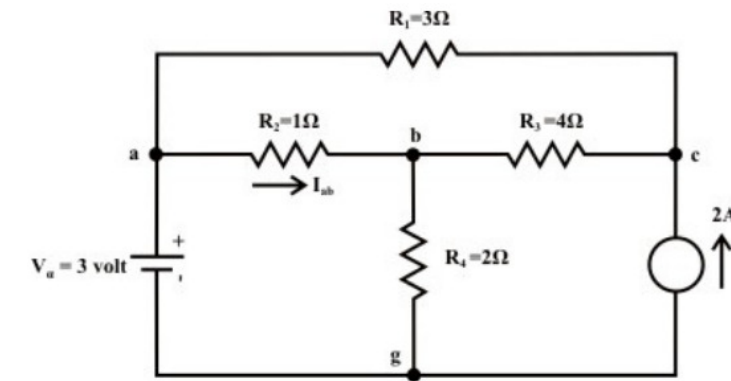


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- Q.3 i. What do you mean by Q-factor of a coil and what is its significance. **2**
 ii. Determine Thevenin's equivalent circuit between terminal a and b. **8**



- OR iii. Calculate I_{ab} using Superposition theorem for given circuit. **8**



- Q.4 i. Describe regulation of a transformer with its significance. **3**
 ii. Explain how to determine equivalent circuit of transformer from various tests. **7**
- OR iii. What are the different types of electrical rotating machines describe them with their speed-torque characteristics. **7**

- Q.5 i. Explain band theory of solids. **4**
 ii. Derive RMS value of full-wave rectifier. **6**
- OR iii. Describe types of BJTs with their input and output characteristics. **6**

- Q.6 Attempt any two: **5**
 i. Explain conversion of Decimal to Hexadecimal number and octal to decimal conversion with suitable example. **5**
 ii. Describe half adder and full adder for binary addition. **5**
 iii. What are the differences between S-R and J-K flipflops. **5**

Marking Scheme

EN3ES04 Basic Electrical and Electronics Engineering

Q.1	i. In the following circuit the value of voltage V1 is ____ Volts. (d) None of these	1		
	ii. Ideal value of internal impedance of current source is (b) Infinite	1		
	iii. For the circuit shown in the figure the Thevenin voltage and resistance seen from the terminal a-b are respectively (d) -14 V, 24 ohm	1		
	iv. For a network having resistors and independent sources, it is desired to obtain Thevenin equivalent across the load which is in parallel with an ideal current source. Then which of the following statement is true? (b) The Thevenin equivalent circuit consists of a voltage source and a series resistor.	1		
	v. Condition of maximum efficiency in transformer is (c) Copper losses equals to core losses	1		
	vi. Disadvantage of autotransformer is/are (a) No isolation between primary and secondary	1		
	vii. Barrier voltage for germanium diode is (a) 0.3V	1		
	viii. PPIV across diode in bridge rectifier is equals to (c) Input voltage	1		
	ix. Hexadecimal equivalent of decimal number 946 is (d) 3B2	1		
	x. Universal logic gate is/are----- (b) NAND	1		
Q.2	i. Faraday's law of electromagnetic induction. Definition of each law 1 mark	2	(1 mark * 2)	
	ii. Current division rules Voltage division rules.	3	1.5 marks 1.5 marks	
	iii. Each nodal equation 1.5 marks Node voltages at node	5	3 marks 2 marks	
OR	iv. Mesh equation 1 mark each (1 mark * 3) Desired current	5	3 marks 2 marks	
Q.3	i. Definition Q-factor of a coil Its significance.	2	1 mark 1 mark	
	ii. Thevenin voltage Circuits Thevenin resistance	8	4 marks 2 marks 2 marks	
OR	iii. Iab due to 3 V source Iab due to 2 A source Iab Total	8	3.5 marks 3.5 marks 1 mark	
Q.4	i. Definition of regulation of a transformer Its significance	3	2 marks 1 mark	
	ii. Equivalent circuit diagram of OC test Equivalent circuit diagram of SC test	7	3.5 marks 3.5 marks	
OR	iii. Description of rotating machine Speed-Torque characteristics	7	3 marks 4 marks	
Q.5	i. Band theory of solids. ii. Circuit diagram/Output waveform RMS value of full-wave rectifier	4	3 marks 3 marks	6
OR	iii. Description BJT Input and output characteristics	6	2 marks 4 marks	
Q.6	Attempt any two: i. Each conversion 2.5 marks ii. Half adder Full adder for binary addition. iii. Each difference between S-R and J-K flipflops. 1 mark each	5	(2.5 marks * 2) 2 marks 3 marks (1 mark *5)	5 5 5
