Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering / Science

End Sem Examination May-2023

EN3ES17 / BC3ES01 Basic Electrical Engineering

Programme: B.Tech. / B.Sc. 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. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. According to Thevenin's theorem, any bilateral network can be represented by a network with- **1**

(a) An independent current source in parallel to the equivalent resistance

(b) An independent voltage source in series to the equivalent resistance

(c) An independent voltage source in parallel to the equivalent resistance

(d) None of these

ii. According to Kirchhoff's voltage law- **1**

(a) The algebraic sum of all the e.m.fs in the circuit is zero

(b) Algebraic sum of all the voltage drops in the circuit is zero

(c) Algebraic sum of all the e.m.fs plus algebraic sum of voltage drops is equal to zero

(d) All of these

iii. The condition of resonance in series R-L-C circuit is- **1**

(a) Resistance (R) = Inductive reactance (X_L)

(b) Resistance (R) = Capacitive reactance (X_C)

(c) Inductive reactance (X_L) = Capacitive reactance (X_C)

(d) None of these

iv. The angle between voltage and current in a purely resistive A.C circuit is- **1**

(a) 0^0 (b) 90^0 (lag)

(c) 90^0 (lead) (d) 180^0

P.T.O.

v. The function of pole shoe in DC motor is to- **1**
(a) Produce the necessary magnetic flux
(b) Spread flux in the air gap
(c) Support field coils
(d) Both (b) & (c)

vi. If the voltage rating of transformer is 230V/110V then the transformer is a- **1**
(a) Step up transformer (b) Step down transformer
(c) Both (a) and (b) (d) None of these

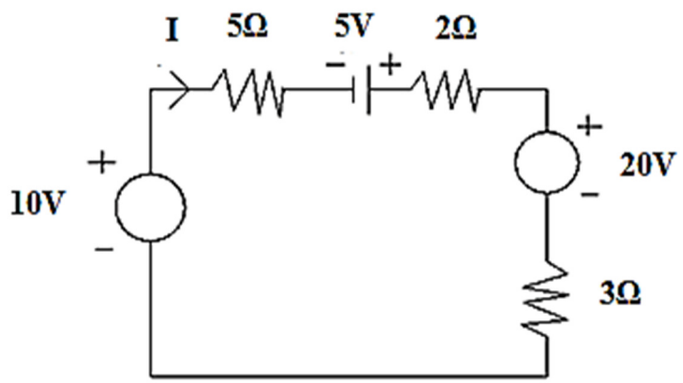
vii. The electric energy meter measures energy in the unit- **1**
(a) KVAH (b) KVARH (c) KWH (d) None of these

viii. Full form of UPS is- **1**
(a) Undersized Power Supply (b) Uninterrupted Power Supply
(c) Uneven Power Supply (d) Unwanted Power Supply

ix. Which of the following are the components of a thermal power plant? **1**
(a) Boiler, Turbine, Condenser, Pump
(b) Boiler, Turbine, Pump, Expansion valve
(c) Evaporator, Condenser, Boiler, Turbine
(d) Evaporator, Condenser, Boiler, Expansion valve

x. Which of the following is an advantage of heating by electricity? **1**
(a) Quicker operation (b) Higher efficiency
(c) Absence of flue gases (d) All of theses

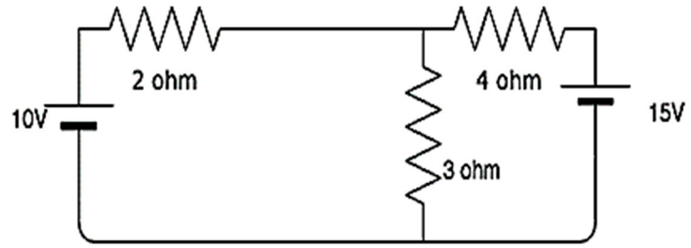
Q.2 i. Solve and find the value of I using KVL. **2**



ii. If Ra, Rb and Rc are respectively the resistances of three sides of delta connection then derive the expression of resistances for equivalent star connection. **3**

iii. State and explain Thevenin's theorem with example. **5**

OR iv. Find the current through 2 ohm and 4 ohm resistor using mesh analysis method. **5**



Q.3 i. Define the following terms: **2**
(a) RMS value (b) Average value of alternating current

ii. A resistance of 20Ω, inductance of 0.2H and capacitance of 100μF are connected in series across 220V, 50Hz supply. Determine the following: (a) Impedance (b) Current (c) Voltage across R, L & C (d) Power factor and (e) Active and Apparant power **8**

OR iii. Derive the relation between line and phase quantity in delta connection of three phase ac system with circuit and phasor diagram. **8**

Q.4 i. Differentiate between core and shell type transformer. **3**

ii. With neat sketch, describe the working principle of D.C motor. **7**

OR iii. Write short notes on the following: (a) single phase induction motor (b) Application of rotating electrical machines. **7**

Q.5 i. Describe about different types of electrical hazards and its precautions. **4**

ii. What is UPS? Explain functioning of online UPS with block diagram. **6**

OR iii. Differentiate between linear and switch mode power supply. **6**

Q.6 Attempt any two:

i. Explain thermal power plants with appropriate diagram. **5**

ii. Explain the principle of induction heating and write down its applications. **5**

iii. Represent each component of power system in single line diagram from generation to distribution. **5**

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Scheme of Marking

MEDI-CAPS UNIVERSITY Knowledge is Power	Faculty of Engineering End Sem Examination May-2023 EN3ES17 Basic Electrical Engineering Programme: B.Tech. | Branch/Specialisation:

Note: The Paper Setter should provide the answer wise splitting of the marks in the scheme below.

Q.1	i)	(b) An independent voltage source in series to the equivalent resistance	**1**
	ii)	(c) Algebraic sum of all the e.m.fs plus algebraic sum of voltage drops is equal to zero	**1**
	iii)	(c) Inductive reactance (X_L) = Capacitive reactance (X_C)	**1**
	iv)	(a) 0^0	**1**
	v)	(d) Both (b) & (c)	**1**
	vi)	(b) Step down transformer	**1**
	vii)	(c) KWH	**1**
	viii)	(b) Uninterrupted Power Supply	**1**
	ix)	(a) Boiler, Turbine, Condenser, Pump	**1**
	x)	(d) All of the above	**1**
Q.2	i.	Applying KVL law – 01 Determination I - 01	**2**
	ii.	For each resistance expression for star one mark- 1+1+1	**3**
	iii.	Statement - 01 Explanation - 02 Example - 02	**5**
OR	iv.	Current through 2 ohm – 2.5 Current through 2 ohm – 2.5	**5**
Q.3	i.	RMS value - 01 Average value - 01	**02**
	ii.	Impedance - 01 Current- 01 Voltage across R,L,C- 03 Power factor - 01	**8**

		Active and Apparant power - 02	
OR	iii.	Circuit diagram - 02 Phasor diagram - 03 Relationship - 03	**08**
Q.4	i.	Three difference - 03	**03**
	ii.	Diagram - 03 Working principle explanation - 04	**07**
OR	iii.	Single phase induction motor - 04 Application of rotating machines - 03	**07**
Q.5	i.	Electrical hazards - 02 Precautions - 02	**04**
	ii.	Definition of UPS - 01 Block diagram of UPS - 3 Working - 02	**06**
OR	iii.	Three difference - 06 (02 each)	**06**
Q.6			
	i.	Diagram - 03 Explanation - 02	**05**
	ii.	Working principle- 03 Application - 02	**05**
	iii.	Single line diagram - 03 Component description - 02	**05**

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