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

Enrollment No.....

Faculty of Engineering

End Sem (Even) Examination May-2022

EN3ES17 Basic Electrical 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 closed path made by several branches of the network is known as- **1**
(a) Branch (b) Loop (c) Circuit (d) Node

ii. While Thevenizing a circuit between two terminals, V_{th} is equal to- **1**
(a) Short-circuit terminal voltage
(b) Net voltage available in the circuit
(c) Open-circuit terminal voltage
(d) E.M.F. of the battery nearest to the terminals

iii. In a pure inductive circuit- **1**
(a) The current is in phase with the voltage
(b) The current legs behind the voltage by 90^o
(c) The current leads the voltage by 90^o
(d) The current can lead or a leg by 90^o

iv. The term "RMS" stands for____. **1**
(a) Root-Mean-Square (b) Read Only Memory
(c) Random Machine System (d) None of these

v. The brushes of electrical machines are made of- **1**
(a) Copper (b) Cast iron (c) Carbon (d) Steel

vi. The transformer ratings are expressed in terms of- **1**
(a) kW (Kilowatt)
(b) Volts
(c) kVAR (Kilo-Volt-Ampere-Reactive)
(d) kVA (Kilo-Volt-Ampere)

vii. What are the Main Parts of SMPS? **1**
(a) AC Output (b) High efficiency
(c) Increase back up time (d) Multi-tasking

P.T.O.

viii. The primary function of a fuse is to- **1**
(a) Open the circuit
(b) Protect the appliance
(c) Prevent excessive currents from flow through the circuit
(d) Protect the line

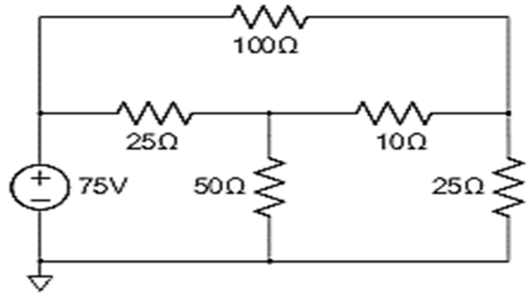
ix. What are the applications of dielectric heating? **1**
(a) Preheating of Plastic Upgrades (b) Wood Gluing
(c) Baking of Foundry Cores (d) All of these

x. Hydro power plants generate electricity using- **1**
(a) Chemical energy (b) Mechanical energy
(c) Nuclear energy (d) None of these

Q.2 i. Define ideal and practical voltage and current source. **2**

ii. State and explain the Kirchhoff's laws. **3**

iii. Determine current in 50-ohm resistor by using nodal analysis in the circuit shown in figure below. **5**



OR iv. Obtain equivalents Star from Delta in Star-Delta transformation. **5**

Q.3 i. Explain the True power, Reactive power and Apparent power. **2**

ii. A coil having a resistance of 30 Ω and inductance of 0.05 H is connected in series with a capacitor of 100 μF. The whole circuit has been connected to a single phase 230 V, 50 Hz supply. Calculate impedance, current, power factor, power and apparent power of the circuit. **8**

OR iii. Derive the expression for resonant frequency & quality factor for an AC circuit under the condition of series resonance. **8**

Q.4 i. Write application of Single-Phase Induction Motor. **3**

ii. Explain the principle of operation of a single-phase transformer. Develop EMF equation for a single-phase transformer. **7**

OR iii. List all the important parts of a D. C. Motor and explain the importance of each one. **7**

Q.5 i. What are the main parts of SMPS? **4**

ii. Explain different types of wires and cables. **6**

OR iii. Explain the following: **6**
(a) Need of Earthing (b) MCB

Q.6 Attempt any two:

i. Briefly describe the main parts and the working of a thermal power plant. **5**

ii. Draw the single line diagram of a power system network showing various voltage levels. **5**

iii. What is electric heating? Also write its advantages. **5**

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Marking Scheme
EN3ES17 Basic Electrical Engineering

Q.1	i.	A closed path made by several branches of the network is known as- (b) Loop		**1**
	ii.	While Thevenizing a circuit between two terminals, V_{th} is equal to- (c) Open-circuit terminal voltage		**1**
	iii.	In a pure inductive circuit- (b) The current legs behind the voltage by 90º		**1**
	iv.	The term "RMS" stands for____. (a) Root-Mean-Square		**1**
	v.	The brushes of electrical machines are made of- (c) Carbon		**1**
	vi.	The transformer ratings are expressed in terms of- (d) kVA (Kilo-Volt-Ampere)		**1**
	vii.	What are the Main Parts of SMPS? (a) AC Output (b) High efficiency (c) Increase back up time (d) Multi-tasking		**1**
	viii.	The primary function of a fuse is to- (c) Prevent excessive currents from flow through the circuit		**1**
	ix.	What are the applications of dielectric heating? (d) All of these		**1**
	x.	Hydro power plants generate electricity using- (d) None of these		**1**
Q.2	i.	Define ideal and practical voltage Current source	1 mark 1 mark	**2**
	ii.	State and explain the Kirchhoff's laws. KCL KVL	 1.5 marks 1.5 marks	**3**
	iii.	Nodal analysis Current in 50-ohm resistor	3 marks 2 marks	**5**
OR	iv.	Obtain equivalents Star from Delta in Star-Delta transformation. As per the explanation		**5**
Q.3	i.	True power, Reactive power and Apparent power.		**2**
	ii.	Calculate impedance Current Power factor Power Apparent power of the circuit	2 marks 2 marks 2 marks 1 mark 1 mark	**8**
OR	iii.	Derivation for resonant frequency Quality factor for an AC circuit	5 marks 3 marks	**8**
Q.4	i.	Application of Single-Phase Induction Motor 1 mark for each application	 (1 mark * 3)	**3**
	ii.	Principle of operation of a single-phase transformer EMF equation for a single-phase transformer	3 marks 4 marks	**7**
OR	iii.	Construction and parts of a D. C. Motor Explanation of each	2 marks 5 marks	**7**
Q.5	i.	Main parts of SMPS and explanation		**4**
	ii.	Types of wires Types of cables	3 marks 3 marks	**6**
OR	iii.	(a) Need of Earthing (b) MCB	3 marks 3 marks	**6**
Q.6		Attempt any two:		
	i.	Main parts of a thermal power plant Working of a thermal power plant	2 marks 3 marks	**5**
	ii.	Single line diagram of a power system network As per the explanation		**5**
	iii.	Electric heating Its advantages	2 marks 3 marks	**5**

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