OR iii. Write need of starters. Explain working of capacitor start single phase induction motor. **8**

Q.6 i. Draw the circuit symbol of Zener diode, UJT, MOSFET and SCR. **2**

ii. Compare half wave and full wave rectifier with the help of their circuit and input, output voltage waveforms. **8**

OR iii. Define gain. Explain working of transistor as an amplifier. **8**

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Total No. of Questions: 6 *Total No. of Printed Pages:4*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2017

ME2ES07 Basics of Electrical and Electronics Engineering

Programme: Diploma Branch/Specialisation: ME

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. If 125V is applied across a 250V, 100W bulb. The power consumption will be **1**

(a) 100W (b) 50W

(c) 25W (d) 12.5W

ii. The practical unit of electrical energy is, **1**

(a) Joule-second (b) Watts-second

(c) Kilowatt-hour (d) Watt-hour

iii. The power factor of a purely inductive circuit is, **1**

(a) Lagging (b) Leading

(c) Zero lagging (d) Unity

iv. In a balanced 3-phase delta connected system, the relationship between the rms values of line currents and the phase current is given by, **1**

(a) $I_L = I_{ph}$ (b) $I_L = \sqrt{3}\ I_{ph}$

(c) $I_{ph} = \sqrt{3}\ I_L$ (d) $I_L = \sqrt{2}\ I_{ph}$

v. The rotating part of the dc machine is generally called, **1**

(a) Stator (b) Rotor

(c) Pole (d) Armature

vi. The commutator of a dc motor serves the purpose of, **1**

(a) Changing ac into dc (b) Converting dc into ac

(c) Reducing friction (d) Avoiding arc at the brushes

vii. Transformers basically work on, **1**
(a) Mutual induction (b) Self induction
(c) Static induction (d) None of these

viii. 3-phase slip-ring induction motor, when fed from a 3-phase, *f* Hz supply, operates at a slip, *s*. Then the frequency of induced emf in the stator and rotor are, respectively given by, **1**
(a) *sf, f* (b) *f, f*
(c) *sf, sf* (d) *f, sf*

ix. Transistor can be used as an amplifier when it is operated **1**
(a) In the saturation region
(b) In the cut-off region
(c) In the active region
(d) In both saturation & cut-off regions

x. Ripple factor for a half-wave and full-wave rectifier circuit, respectively are **1**
(a) 0.48 and 1.21 (b) 0.48 and 0.121
(c) 4.8 and 1.21 (d) 8.21 and 0.48

Q.2 i. Enlist the name of sources available for DC and AC supply. Also write the standard voltages used in generation, transmission and distribution. **2**

ii. What is the statement of Ohm's law? Calculate the current flowing through the various resistances in the circuit shown in figure (1). **8**

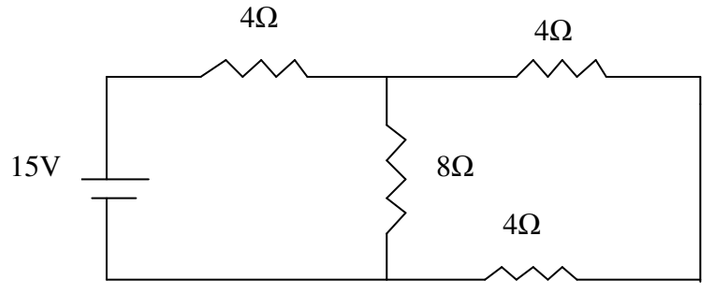

Figure (1)

OR iii. Write the statement of Kirchhoff's voltage and current law. With the Kirchhoff's laws, solve the network shown in figure (2) and find the current in each branch. **8**

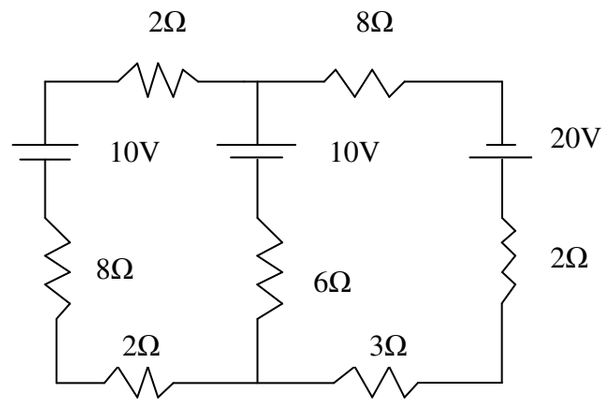

Figure (2)

Q.3 i. Define frequency, average value, RMS value and form factor for the sinusoidal voltage wave. **2**

ii. Enlist power factor improving methods. A coil of resistance 20 ohms and inductance 0.5H is connected in series with a condenser of capacitance 100 micro-farad across a 230V, 50Hz supply. Determine – impedance, current of the circuit, power factor, voltage across the coil, and voltage across the condenser. **8**

OR iii. Compare star connection and delta connection of the three phase ac supply system. Also write advantages of three phase supply. **8**

Q.4 i. Write Fleming's left hand and right hand rule. **2**

ii. Enlist the main parts of a dc machine. Explain functions of each part. **8**

OR iii. Compare characteristics of DC series and shunt motor. Enlist electric shock preventive methods. **8**

Q.5 i. A 50kVA transformer has a voltage ratio of 3300/400V. Calculate the primary and secondary currents. **2**

ii. Describe the principle of operation of three phase induction motor. Also enlist applications of three phase induction motors. **8**

ME2ES07 Basics of Electrical and Electronics Engineering

Marking Scheme

Q.1	i.	If 125V is applied across a 250V, 100W bulb. The power consumption will be (c) 25W	**1**
	ii.	The practical unit of electrical energy is, (c) Kilowatt-hour	**1**
	iii.	The power factor of a purely inductive circuit is, (c) Zero lagging	**1**
	iv.	In a balanced 3-phase delta connected system, the relationship between the rms values of line currents and the phase current is given by, (b) $I_L = \sqrt{3}\ I_{ph}$	**1**
	v.	The rotating part of the dc machine is generally called, (d) Armature	**1**
	vi.	The commutator of a dc motor serves the purpose of, (b) Converting dc into ac	**1**
	vii.	Transformers basically work on, (a) Mutual induction	**1**
	viii.	3-phase slip-ring induction motor, when fed from a 3-phase, *f* Hz supply, operates at a slip, *s*. Then the frequency of induced emf in the stator and rotor are, respectively given by, (d) *f, sf*	**1**
	ix.	Transistor can be used as an amplifier when it is operated (c) In the active region	**1**
	x.		**1**
Q.2	i.	**1 mark** for sources available for DC and AC supply **1 mark** for standard voltages	**2**
	ii.	**2 marks** for statement of Ohm's law **6 marks** for Numerical 1 mark +1 mark = 2 marks for equation 1 mark +1 mark +1 mark +1 mark = 4 marks for current	**8**
OR	iii.	**3 marks** for Kirchhoff's voltage and current law. **5 marks** for Numerical (2 marks for equation + 3 marks for current)	**8**
Q.3	i.	0.5 marks for each definition 0.5 mark * 4 = **2 marks**	**2**
	ii.	**2 marks** for power factor improving methods **6 marks** for numerical 1 mark for current diagram 1 mark for finding each unknown quantities (1 mark * 5= 5 marks)	**8**
OR	iii.	**5 marks** for comparison of star and delta connection **3 marks** for advantages of three phase supply	**8**
Q.4	i.	**1 mark** for Fleming's left hand rule **1 mark** for Fleming's right hand rule.	**2**
	ii.	Parts of a dc machine **2 marks** for diagram **6 marks** for parts + explanation	**8**
OR	iii.	**5 marks** for DC series and shunt motor **3 marks** for electric shock preventive methods	**8**
Q.5	i.	**1 mark** for primary currents **1 mark** for secondary currents.	**2**
	ii.	**5 marks** for principle of operation **3 marks** for applications	**8**
OR	iii.	**3 marks** for need of starters **5 marks** for working of capacitor start	**8**
Q.6	i.	0.5 for each circuit symbol 0.5 mark * 4 = **2 marks**	**2**
	ii.	**4 marks** for half wave rectifier **4 marks** for full wave rectifier	**8**
OR	iii.	**2 marks** for definition of gain **6 marks** for working of transistor	**8**