Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (New) EXAMINATION – WINTER 2015

Subject Code:2133402 **Date:21/12/2015**

Subject Name: ELECTRICAL DRIVES AND CONTROLS

Time: 2:30pm to 5:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

MARKS

Q.1 **Short Questions** **14**

1 Brushes of D.C. machines are made of
(a) carbon
(b) soft copper
(c) hard copper
(d) all of above

2 The insulating material used between the commutator segments is normally
(a) graphite
(b) paper
(c) mica
(d) insulating varnish

3 The direction of rotation of a D.C. series motor can be changed by
(a) interchanging supply terminals
(b) interchanging field terminals
(c) either of (a) and (b) above
(d) None of the above

4 Which of the following application requires high starting torque ?
(a) Lathe machine
(b) Centrifugal pump
(c) Locomotive
(d) Air blower

5 Which D.C. motor is referred for elevators ?
(a) Shunt motor
(b) Series motor
(c) Differential compound motor
(d) Cumulative compound motor

6 Starters are used with D.C. motors because
(a) these motors have high starting torque
(b) these motors are not self-starting
(c) back e.m.f. of these motors is zero initially
(d)to restrict armature current as there is no back e.m.f. while starting

7 To get the speed of D.C, motor below the normal without wastage of electrical energy is used.
(a) Ward Leonard control
(b) rheostatic control
(c) any of the above method
(d) none of the above method

8 The speed of a D.C. shunt motor more than its full-load speed can be obtained by
(a) decreasing the field current
(b) increasing the field current
(c) decreasing the armature current
(d) increasing the armature current

9 A single-phase induction motor is
(a) inherently self-starting with high torque
(b) inherently self-starting with low torque
(c) inherently non-self-starting with low torque
(d) inherently non-self-starting with high torque

10 The wattage rating for a ceiling fan motor will be in the range
(a) 200 to 250 W
(b) 250 to 500 W
(c) 50 to 150 W
(d) 10 to 20 W

11 Which type of load is offered by cranes and hoists ?
(a) Gradually varying load
(b) Non-reversing, no-load start
(c) Reversing, light start
(d) Reversing, heavy start

12 The wattage of motor for driving domestic sewing machine will be around
(a) 100 to 150 W
(b) 40 to 75 W
(c) 10 to 30 W
(d) 5 to 10 W

13 The speed of a squirrel-cage induction motor can be controlled by all of the following except
(a) changing supply frequency
(b) changing number of poles
(c) changing winding resistance
(d) reducing supply voltage

14 Slip ring motor is recommended where
(a) speed control is required
(b) frequent starting, stopping and reversing is required
(c) high starting torque is needed
(d) all above features are required

Q.2	**(a)**	Write a note on factors influencing the choice of electrical drives.	**03**
	(b)	Give the advantages of variable speed drives.	**04**
	(c)	State the different types of DC motors in detail.	**07**
		OR	
	(c)	Compare A.C and D.C drives.	**07**
Q.3	**(a)**	Draw and explain Speed-Armature current characteristic of DC shunt motor	**03**
	(b)	Draw and explain Speed-Armature current characteristic of DC series motor	**04**
	(c)	Draw and explain torque/speed curve of 3-phase induction motor	**07**
		OR	
Q.3	**(a)**	Draw and explain Torque-Speed characteristic of DC series motor	**03**
	(b)	Draw and explain Torque-Speed characteristic of DC shunt motor	**04**
	(c)	Explain Electric braking of DC shunt motor.	**07**
Q.4	**(a)**	Draw and explain rotor rheostat control of slip-ring induction motor in brief.	**03**
	(b)	Explain armature control of DC shunt motor.	**04**
	(c)	Explain DC series motor drive with controlled rectifier.	**07**
		OR	
Q.4	**(a)**	Explain Rotor resistance starter.	**03**
	(b)	Write a note on construction of 3-phase induction motor.	**04**
	(c)	Explain speed control of induction motor by frequency control using inverter.	**07**
Q.5	**(a)**	What is the need of starter in DC motor?	**03**
	(b)	Explain working of Star-Delta starter in brief.	**04**
	(c)	Explain Ward-Leonard system for DC motor speed control.	**07**
		OR	
Q.5	**(a)**	Explain working of three-point starter in brief.	**03**
	(b)	Explain Half bridge inverter with inductive load.	**04**
	(c)	Compare chopper and Controlled rectifiers.	**07**

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