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OR

Describe the construction, working principle and control of PMBLDC bi-polar drive in detail and compare it with unipolar drive

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Total No. of Questions :5]

[Total No. of Printed Pages :4

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**EE-703**

**B.E. VII Semester**

Examination, December 2016

**Electrical Drives**

*Time : Three Hours*

*Maximum Marks : 70*

- Note:* i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.  
ii) All parts of each question are to be attempted at one place.  
iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.  
iv) Except numericals, Derivation, Design and Drawing etc.

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1. a) Define Electric drive.  
b) Explain the function of power modulator in electrical drive.  
c) Draw the block diagram of a electrical drive.  
d) What are the main factors which decide the choice of electrical drive for a given applications.

OR

What is the current states of d.c. and a.c. drives?

2. a) Name the best method for speed control of d.c. motor.  
b) Explain why a d.c. series motor is more suited to deal with torque overload than other d.c. motors.

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- c) Explain constant torque and constant power for d.c. drives.
- d) Draw and explain the speed torque characteristics of separately excited d.c. motor during  
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  - i) Regenerative braking
  - ii) Dynamic braking

OR

A 200V, 10.5 A, 2000 rpm. shunt motor has the armature and field resistance of 0.5 and  $400\Omega$  respectively. It drives a load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175 volts.

- 3. a) Draw torque-slip characteristics of a three phase induction motor.
- b) For starting three phase induction motor, various starters are used. Why?
- c) Explain the comparison of current source inverter and voltage source inverter.
- d) Explain Voltage Source Inverter (VSI) or cycloconverter method for speed control of three phase induction motor.

OR

Explain with circuit diagram, static scherbius drive or static Kramer drive scheme for speed control of wound Rotor induction motor.

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- 4. a) Name the commonly used synchronous motors.
- b) Why a synchronous motor does not have starting torque?
- c) When started on no load, a salient pole synchronous motor pulls into synchronism even before d.c. excitation is applied why? [www.rgpvonline.com](http://www.rgpvonline.com)
- d) Explain self controlled synchronous motor drive using a cycloconverter with the help of diagram.

OR

A 6MW, 3-phase 11kV Y-connected, 6 pole, 50Hz, 0.9 (leading) power factor synchronous motor has  $X_s = 9\Omega$  and  $R_s = 0$ . Rated field current is 50A. Machine is controlled by variable frequency control at constant (V/f) ratio up to the base speed and at constant V. above base speed. Determine :

Torque and field current for the rated armature current 750 rpm and 0.8 leading power factor.

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- 5. a) What are the applications of stepper motors?
- b) What are the advantages of switched reluctance motor drive over other a.c. motor drive?
- c) What are the difference in the behaviour of variable reluctance and permanent magnet stepper motor?
- d) Explain any one schemes used for the following drives :
  - i) Paper mills
  - ii) Electric traction