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SE-7429

B. E. IV (Sem. VII) (IC) Examination

April / May – 2011

Industrial Drives & Control

Time : **3** Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **B. E. IV (Sem. VII) (IC)**

Name of the Subject :

☛ **Industrial Drives & Control**

☛ Subject Code No. : **7 4 2 9** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Attempt all questions.
(3) Figure to the right indicates marks.
(4) Answer of two section must be written in separate answer books.

1 (a) Give the answers in brief : **10**

(1) What is the electrical time constant of a D.C. drive ? **2**

(2) What are the disadvantages of the open loop control of D.C. drives ? **2**

(3) What are the different operating modes of DC motor ? **3**

(4) What is the range of output voltage of a class A chopper if the input voltage is 'V' ? **2**

(5) What are the different breaking modes of the dc drive ? **2**

(b) The chopper used for on-off control of DC separately excited motor has a supply voltage of 230 VDC, an on-time of 10 msec. and off-time of 15 msec. Assuming continuous conduction of motor current, calculate the average load current when the motor speed is 1500 rpm and has a voltage constant of $K_v = 0.5$ V/rad per sec. The armature resistance is 3Ω. **8**

2 (a) Explain the chopper controlled DC motor set up with diagram. 8

(b) Give two methods of speed control for DC motors. 8

OR

2 (a) Explain three-phase full converter DC drive. Write necessary equations. 8

(b) Sketch the characteristics of a separately excited DC motor. Indicate clearly the constant torque and constant power drive regions. 8

3 Answer any **two** : **16**

(1) What is rheostatic break control ? Explain in detail by diagrams and mathematical expression.

(2) Explain three-phase semi converter dc drive. Write necessary equations.

(3) Explain the basic characteristics of dc motor with necessary diagram and equation.

4 (1) Name a few techniques for speed control of AC motors. **10**

(2) State the disadvantages of AC drives.

(3) Write a few applications of AC drives.

(4) What do you mean by slip in induction motor ?

(5) State the two types of induction motors.

(b) Explain series inverter. 8

5 (a) Explain the constant power mode of induction motor. 8

A, 3 phase 400V, 15kW, 1440 rpm, 50 Hz., star connected induction.

(b) Motor has rotor leakage impedance of $0.4+j.1.6\,\Omega$. 8

Calculate the motor torque for full load and the motor slip.

OR

5 (a) Explain the speed-torque curve of an induction motor. 8

(b) A 400, 50 Hz, 3 phase SCIM develops full load torque remaining constant, calculate the motor speed. Assume speed torque characteristics of motor to be linear in stable region. Neglect stator resistance. 8

6 Write a short note on any **two** : **16**

(a) Stator frequency control

(b) PWM inverter

(c) Stator voltage control.