Total No. of Questions :8]　　　*[Total No. of Printed Pages :2*

Roll No ....

MEPS-302(B)

M.E./M.Tech., III Semester

Examination, June 2017

Advanced Electrical Drives

(Elective - II)

Time : Three Hours

Maximum Marks : 70

Note: i)　Attempt any five questions out of eight.

　　　ii) Each question carries equal marks.

1.　a)　What are the main factors which decide the choice of electric drive for a given application?

　　b)　Explain that the steady state stability of a drive depends on relative characteristics of the motor and load and not just on motor or load characteristic.

2.　a)　What are the components of load torques? Compare passive and active load torques.

　　b)　Describe the concept of multiquadrant operation of a drive.

3.　a)　Explain thermal model of motor for heating and cooling.

　　b)　Half hour rating of a motor is 100kW. Heating time constant is 80 min and the maximum efficiency occurs at 70% full load. Determine the continuous rating of the motor.　**www.rgpvonline.com**

4.　a)　A 230V, 870 rpm and 100A dc separately excited motor has an armature resistance of 0.05Ω. It is coupled to an overhauling load with a torque of 400 N-m. Determine the speed at which motor can hold the load by regenerative braking.

　　b)　A 220V, 24A, 100 rpm, separately excited dc motor has an armature resistance of 2Ω. Motor is controlled by a

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chopper with frequency of 500 Hz and source voltage of 230V. Calculate the duty ratio for 1.2 times rated torque and 500 rpm.　**www.rgpvonline.com**

5.　a)　What are the disadvantages of induction motor operation with unbalanced supply voltages?

　　b)　What is done to shift the operation of an inverter-fed induction motor from motoring to braking?

　　c)　A 3-phase, 400V, 50Hz, 6-pole, 960 rpm, Y connected wound rotor induction motor has the following constants referred to the stator:

$R_s = 0.5Ω$, $R'_r = 0.7Ω$, $X_s = 1.5Ω$, $X'_r = 1.6Ω$.

The speed of the motor is reduced to 800 rpm at half full load torque by injecting a voltage in phase with the source voltage into the rotor. Calculate the magnitude and the frequency of the injected voltage. Stator to rotor turns ratio is 2.2.

6.　a)　What is the basic difference between true synchronous mode and self control mode for variable frequency control of synchronous motor? Discuss.

　　b)　How the operation of a synchronous motor drive shifts from motoring to regenerative braking? Explain.

7.　a)　Describe the operation of brushless dc motor drive with neat diagram and output quantities waveforms.

　　b)　Explain dynamic braking operation of 25kV ac traction drive using thyristor converter fed dc motors.

8.　Write short notes on any two of the following:

　　a)　Energy conservation in electrical drives

　　b)　Close loop control of I.M. drives

　　c)　Solar powered drives

　　d)　Operation of synchronous motor drive fed from fixed frequency supply.　**www.rgpvonline.com**

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