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NEW SCHEME

Eighth Semester B.E. Degree Examination, May 2007
Electrical & Electronic Engineering
Industrial Drives & Applications

Time: 3 hrs.]

[Max. Marks:100

Note : Answer any FIVE full questions.

- 1
 - a. Explain dynamic braking of DC motor. Give its merits and demerits. (10 Marks)
 - b. A 220 V, 970 rpm, 100 A, dc separately excited motor has an armature resistance of 0.05Ω . It is braked by plugging from an initial speed of 1000 rpm. Calculate
 - i) Resistance to be placed in armature circuit to limit braking current to twice the full load value.
 - ii) Braking torque.
 - iii) Torque when the speed falls to zero. (10 Marks)

- 2
 - a. How an induction motor can be braked by regenerative approach? Explain with a neat schematic and W-T characteristic. (10 Marks)
 - b. A 3-phase, star connected 440 V, squirrel cage motor has the following equivalent circuit parameters referred to stator: $R_1 = 0.1 \Omega$, $R_2' = 0.1 \Omega$, $X_1 = X_2' = 0.4 \Omega$. Determine
 - i) Starting current of the motor when switched direct on line.
 - ii) The stator current at the start of reverse current braking assuming slip to be 4%. (10 Marks)

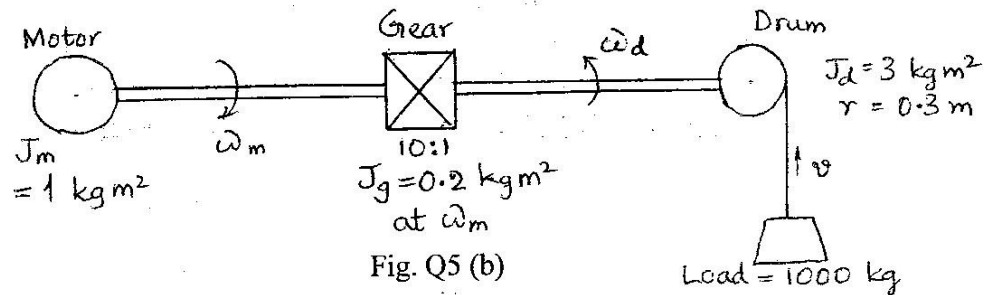
- 3
 - a. Obtain an expression for the temperature rise of an electric motor due to heating. Draw a typical heating curve. (10 Marks)
 - b. The 15 minute rating of a motor used in domestic mixer is 400 W. If the heating time constant is 60 min, determine the continuous rating. Assume that the maximum efficiency of motor occurs at 80% of full load. (10 Marks)

- 4
 - a. Develop an expression to determine power rating of electric motor using the method of equivalent current for variable load conditions. (10 Marks)
 - b. A horizontal conveyor belt moving at a uniform velocity of 1 m/s transports load at the rate of 50000 kg/hr. The belt is 180 m long and is driven by a 960 rpm motor. Determine the equivalent rotational inertia at the motor shaft. (10 Marks)

- 5
 - a. Derive an expression for the equivalent load torque and equivalent moment of inertia as referred to motor shaft of a motor-load combination where the load is fed through a gear system. (10 Marks)

Contd...2

5. b. In the mechanism shown, the motor drives the winch drum through 10 : 1 reduction gear. Assuming that the shaft and cable are non elastic, calculate the equivalent inertia of the motor and mechanism referred to motor shaft. (10 Marks)



6. a. Describe briefly the process involved in a cement factory. What are the required features of electric drives? What are the drives employed? Explain. (10 Marks)
- b. What are the different steps followed in a textile industry? Give an account of the electric drives employed with proper reasoning. (10 Marks)
7. a. Give a brief idea of simplified speed – time curves for traction application. Obtain an expression for maximum speed for trapezoidal speed-time curve. (10 Marks)
- b. A train is required to run between two stations 1.6 km apart at an average speed of 43 km/hr. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is to be limited to 64 km/hr, acceleration to 2 km/hr/sec and coasting and braking retardation to 0.16 and 3.2 km/hr/sec respectively, determine the duration of acceleration, coasting and braking periods. (10 Marks)
8. Write short notes on:
- Quadrantal speed-torque diagram.
 - Ratings of motors.
 - Coefficient of adhesion.
 - Suitability of dc series motor for traction.
- (20 Marks)
