

**B.Tech. - VIEP - ELECTRICAL ENGINEERING  
(BTELVI)**

**00923** Term-End Examination  
**June, 2018**

**BIEEE-016 : INDUSTRIAL DRIVES**

*Time : 3 hours*

*Maximum Marks : 70*

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*Note : Attempt any seven questions. All questions carry equal marks. Use of scientific calculator is permitted. Assume suitable data, wherever missing.*

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1. Discuss in detail, the closed loop speed control schemes used in multi-motor drives. 10
  
2. A motor equipped with a flywheel is to supply a load torque of 1000 Nm for 100 sec followed by a light load period of 200 Nm, long enough for the flywheel to regain its steady state speed. It is desired to limit the motor torque to 700 Nm. What should be the moment of inertia of the flywheel ? Motor has an inertia of  $10 \text{ kg m}^2$ . Its no load speed is 500 rpm and the slip at a torque of 500 Nm is 5%. Assume speed-torque characteristic of motor to be a straight line in the region of interest. 10

3. Explain the various methods of speed control of dc drive. 10
  
4. A 230 V, 960 rpm and 200 A separately excited dc motor has an armature resistance of  $0.02 \Omega$ . The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assuming continuous conduction.
  - (a) Calculate duty ratio of chopper for motoring operation at rated torque and 350 rpm.
  - (b) Calculate duty ratio of chopper for braking operation at rated torque and 350 rpm.  $2 \times 5 = 10$
  
5. Explain fully controlled rectifier fed dc drive with new schematic diagram and relevant waveforms. 10
  
6. Discuss the voltage source inverter fed induction motor drive operated in stepped wave inverter mode. 10
  
7. Explain the four quadrant operation for a dc motor. 10
  
8. Discuss the current source inverter control of induction motor drive. 10
  
9. Explain the brushless dc motor for servo applications. 10
  
10. Explain the braking of synchronous motor with VSI. Draw the speed-torque characteristics for regenerative braking. 10