| BIEEE-016 |

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

00326 **June, 2015**

BIEEE-016 : INDUSTRIAL DRIVES

Time : 3 hours   *Maximum Marks : 70*

Note :   *(i)*   *Attempt any **seven** questions.*

       (ii)   *All questions carry equal marks.*

       (iii)   *Missing data, if any, may be suitably assumed.*

       (iv)   *Use of scientific calculator is permitted.*

1. (a) Classify the methods of speed control of motors.   5

   (b) Explain the working of phase lock loop speed control of drives with the help of a block diagram.   5

2. (a) Explain the difference between the drives of loads with rotational motion and loads with translational motion.   5

   (b) What are the techniques used to sense the speed of motor in a drive system ?   5

3. Explain the working of single phase fully controlled rectifiers for speed control of DC motors with the help of expressions, waveforms and schematic diagram. *10*

4. A DC series motor, of the following rating :
   $P_{nominal} = 3.73 \text{ kW}$, $V_{nominal} = 250 \text{ V}$,
   $I_{nominal} = 20 \text{ A}$, $N_{nominal} = 1000 \text{ rpm}$,

   is to lower a load with counter current braking at an armature current of $I_a = 1.5*I_{nominal}$ and a speed of 200 rpm in one case and 300 rpm in another. Determine the additional resistance needed to be inserted in the armature circuit. *10*

5. (a) How can the speed of a dc motor be controlled with the help of a chopper ? *5*

   (b) Explain the difference between motoring and braking of dc motors. *5*

6. Explain the working of a Voltage Source Inverter (VSI) fed 3-ϕ induction motor drive with schematic, expressions and waveforms. *10*

7. What is Pulse Width Modulation (PWM) and how is it used in AC drive system ? *10*

8. A 220 V, three-phase, four-pole, 60 Hz, squirrel cage induction motor develops a maximum internal torque of 250% at a slip of 16%, when operating at rated voltage and frequency. If the effect of stator impedance is neglected, determine the maximum internal torque that the motor would develop, if it were operated at 200 V, 50 Hz.   *10*

9. Draw the schematic cum circuit diagram for closed loop speed control of a synchronous motor supplied by a cycloconverter. Also explain its working.   *10*

10. What is brushless dc motor drive ? Also explain its applications.   *10*