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

00967   **Term-End Examination**

June, 2014

BIEEE-016 : INDUSTRIAL DRIVES

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **seven** questions. All questions carry equal marks. Missing data, if any may be suitably assumed. Use of calculators is permitted.*

1. What are the different parts of an electrical drive ? What are the factors on which the choice of an electrical drive depends ?   *6+4=10*

2. An electrical drive has the following equation for motor and load torques :

    $T_m = (1 + 2\omega_m)$ and $T_l = 3\sqrt{\omega_m}$.

    Obtain the equilibrium points and determine their steady-state stability.   *5+5=10*

3. What do you understand by constant torque drive and constant power drive ? State and explain different methods of speed sensing.   *4+6=10*

4. Describe relative merits and demerits of four quadrant dc drives employing non-circulating and circulating current dual converters.   *10*

5. What are the main features of the following types of induction motors :

(a) Deep-bar rotor squirrel-cage induction motor.

(b) Slip ring induction motor. *5+5=10*

6. Develop an expression in terms of motor parameters for the time required to plug an induction motor to 0·95 of synchronous speed in the reverse direction. Also develop an expression for the rotor resistance which will minimise this reversal time. *5+5=10*

7. Draw the circuit diagram and explain the operation of a battery powered dc series motor drive for an electric vehicle without facility for regenerative braking. *4+6=10*

8. When started on no load, a salient pole synchronous motor pulls into synchronism even before dc excitation is applied. Why ? What are the important features of a hysteresis synchronous motor ? What are its applications ? *3+4+3=10*

9. What are the similarities between a brushless dc motor and a conventional dc motor ? Why is it known as a brushless dc motor ? What are its advantages over a conventional dc motor ? *3+3+4=10*

10. Write short notes on any *two* of the following : *2×5=10*

(a) Dual converter fed control

(b) Phase-locked loop speed control

(c) Slip-power recovery scheme