Hall Ticket Number:

Code No.: 7212 M

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

M.E. I Year (EEE) II-Semester (Make Up) Examinations, August-2016

(Power Systems & Power Electronics)

Power Electronics Controlled Electric Drives

Time: **3** hours Max. Marks: **70**

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Part-A (10 X 2=20 Marks)

1. Discuss discontinuous conduction in converters.
2. Briefly explain the principle of forced commutation.
3. Explain the concept of Regenerative Braking in Dc drives in brief.
4. Write the importance of dual converters.
5. What are the essential differences between static kramer drive and static scherbius drive?
6. Write the advantages of CSI fed induction motor drive over VSI fed induction motor drive.
7. Draw the block diagram of microprocessor based synchronous motor drive.
8. List the advantages of microprocessor based control of drives.
9. Draw the speed – torque characteristics of switched reluctance motor drive.
10. Write the features of brushless dc motor.

Part-B (5 × 10=50 Marks)

11. a) Why voltage control is required in inverter circuits? Explain the various methods of voltage control in inverter circuits. [6]

    b) List the advantages and disadvantages of ac voltage converters. [4]

12. a) Explain the state space model of a dc motor. [5]

    b) A dc separately motor takes a current of 80 A on a 480 V supply and runs at 960 rpm. The armature resistance is 0.25 Ω. A chopper is used to control the speed of the motor at constant torque. The on-period of the chopper is 3ms. Determine the duty ratio of the chopper at 750 rpm. [5]

13. a) State and discuss the various methods of speed control of induction motor. [5]

    b) A 440V, 3-phase, 50Hz, 6 pole, 945 rpm, delta connected IM has the following parameters referred to the stator. R_s=2.0 Ω, R_r^1=2.0 Ω, X_s=3 Ω, X_r^1=4 Ω. When driving a load whose torque varies linearly with speed, at rated voltage, it runs at rated speed. The motor speed is controlled by the stator voltage. Determine motor terminal voltage, current and torque at 800 rpm. [5]

14. a) With the help of block diagram, explain the speed control of induction motor using microprocessors. [5]

    b) Explain the operation of 4-phase, 4/2 pole variable reluctance stepper motor. [5]

15. a) Explain with a neat block diagram the operation of a high performance brushless dc motor drive. [5]

    b) Discuss the speed control schemes of switched reluctance motor drive. [5]

16. a) Compare one quadrant and two quadrant converters. [5]

    b) Discuss the digital simulation process of dc motors. [5]

17. Write short notes on any **two** of the following:

    a) Static slip energy recovery schemes employing in the rotor circuit of induction motor. [5]

    b) Speed control of dc motor using microprocessor. [5]

    c) Speed – Torque characteristics of BLDC motor. [5]

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