



**B.E DEGREE EXAMINATIONS: MAY 2018**

(Regulation 2015)

Sixth Semester

**ELECTRICAL AND ELECTRONICS ENGINEERING**

U15EET602: Solid State Drives

**COURSE OUTCOMES**

- CO1:** Compare various types of loads and characteristics of motors  
**CO2:** Choose the braking scheme for motor drives  
**CO3:** Construct the power converter circuit for DC motor drives  
**CO4:** Design the power converter circuit for AC motor drives  
**CO5:** Describe the speed control schemes for DC and AC motor drives  
**CO6:** Select the motor for specific application

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-  
PART A (10 x 1 = 10 Marks)**

1. Matching type item with multiple choice code

CO3 [K<sub>2</sub>]

**List I**

**List II**

A. Single phase full converter

i. Quadrant IV

B. Forward Motoring

ii. Quadrant I and IV

C. Regenerative braking

iii. Quadrant I

D. Dual converter

iv. Quadrant I,II,III &IV

- |    | A   | B   | C   | D  |
|----|-----|-----|-----|----|
| a) | ii  | iii | i   | iv |
| b) | iii | iv  | ii  | i  |
| c) | ii  | iv  | iii | i  |
| d) | iii | i   | ii  | iv |

2. The rectifier is said to operate as an inverter for  $\alpha$

CO3 [K<sub>2</sub>]

- |                |                |
|----------------|----------------|
| a) $=90^\circ$ | b) $=60^\circ$ |
| c) $>90^\circ$ | d) $<90^\circ$ |

3. Which of the following statements are true with respect to the synchronous motor?

CO4 [K<sub>2</sub>]

1. A synchronous reluctance motor can be visualized as a salient pole motor without a field winding.





- a) What would be the temperature rise after 1 hr, if the motor runs continuously on full-load?
- b) If the temperature rise on 1 hr rating is  $80^{\circ}\text{C}$ , find the maximum steady-state temperature at this rating.
- c) How long will the motor take for its temperature to rise from  $50^{\circ}\text{C}$  to  $80^{\circ}\text{C}$ , if it is working at its 1 hr rating?
22. (i) With the help of relevant block diagram explain the slip power recovery scheme. (7) CO6 [K<sub>2</sub>]  
(ii) Discuss static rotor resistance control scheme of induction motor drive. (7)
23. Explain the multi-quadrant operation of a separately excited DC motor drive fed from a dual converter in detail with neat diagrams. CO4 [K<sub>2</sub>]
24. With suitable waveforms and mathematical expression, explain the operation of single phase fully controlled rectifier fed separately excited DC motor drive. CO3 [K<sub>2</sub>]
25. Discuss and draw the speed-torque characteristics of various types of loads with neat diagrams. CO1 [K<sub>2</sub>]
26. Explain the operation of chopper for forward motoring and braking control of separately excited DC motor with the aid of diagrams and waveforms. Also obtain the expression for motor terminal voltage and speed. CO3 [K<sub>2</sub>]
27. Explain with neat diagram the self-controlled synchronous motor drive employing a cycloconverter. CO4 [K<sub>2</sub>]

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