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No.

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DEI1348

## Power Electronics - II (New) (1290)

P. Pages : 2

Time : Three Hours

Max. Marks : 100

Instructions to Candidates :

1. Do not write anything on question paper except Seat No.
2. Answersheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Attempt **any two** from each questions.
5. Assume suitable data if necessary.
6. Use of non-programmable calculator is allowed.
7. Figures to right indicates full marks.

### UNIT - I

1. a) State & explain the desirable capabilities of a power electronic converter. **10**  
b) Derive the expression for the total equivalent electromagnetic torque 'Tem' to be developed by motor in case of a feed screw drive system. **10**  
c) The speed of a 10hp, 230V, 1200rpm separately excited dc motor is controlled by a  $1\phi$  full converter. The rated motor current is 40 A, &  $R_a = 0.25\Omega$ . The ac supply voltage is 230V, 50Hz. The motor voltage const.  $K_a\phi = 0.182\text{ V/rpm}$ . The motor current is continuous & ripple free. The firing angle  $\alpha$  of armature converter is  $30^\circ$ . For the rated motor current, calculate -  
i) Motor Torque (T)  
ii) Speed of motor.  
iii) Supply power factor. **10**

### UNIT - II

2. a) Draw the block diagram & explain adjustable speed control of PWM-VSI drive without speed feedback. **10**  
b) Explain the effect of non-sinusoidal excitation on I.M. with respect to torque pulsation & harmonic motor currents. **10**

- c) What is braking ? What are the different methods of braking ? How braking of Induction motor can be carried out ? 10

### UNIT - III

3. a) Draw the circuit diagram & explain the operation of open Emitter BJT drive circuit. 10
- b) Explain different circuit layout considerations & methods to minimise stray inductance in drive circuit. 10
- c) What is need of drive circuit ? Draw & explain circuit diagram for base current drive circuit for power BJT. 10

### UNIT - IV

4. a) Draw & explain basic diode snubber circuit. Also, show how it can be implemented for a full wave centre tapped rectifier. 10
- b) Explain the operation of turn on snubber with neat circuit diagram & waveform. 10
- c) Explain the turn off snubber circuit in detail. 10

### UNIT - V

5. a) Explain the operation of high frequency lightning system. 10
- b) State the basic types of static VAR control & explain thyristor controlled inductor in detail. 10
- c) Explain the principle of active shaping of the input current. Also explain different current mode control schemes. 10

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