

[This question paper contains 2 printed pages.]

Sr. No. of Question Paper : 2335

F-4

Your Roll No.....

Unique Paper Code : 2511406

Name of the Course : B. Tech. Instrumentation

Name of the Paper : Electrical Instruments

Semester : IV

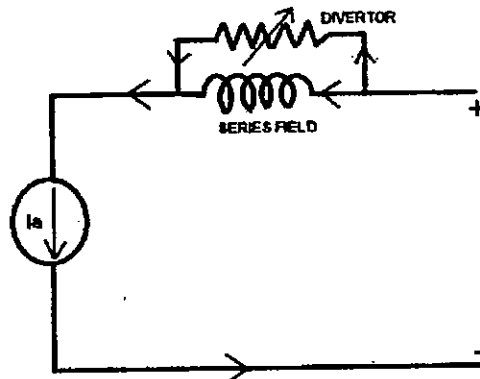
Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any five questions.
3. Question No. 1 is compulsory.

1. (a) What is the difference between transistor and thyristors ? (3)  
(b) What is a SMPS and state its applications ? (3)  
(c) Write the laws applied in understanding the working of a transformer. (3)  
(d) Identify the circuit. Explain the working of the circuit. (3)



- (e) Explain principle of working of single phase induction motor. (3)
2. (a) Explain IV characteristics of a SCR and its different regions of operation. (7)  
(b) What are different turn on methods of a thyristor ? Explain any two. (5)  
(c) If V<sub>g</sub>-I<sub>g</sub> characteristics of an SCR is assumed to be a straight line passing through the origin with a gradient of  $5 \times 10^4$ , calculate the required gate source resistance. Given E<sub>g</sub> = 10V and allowable P<sub>g</sub> = 0.015W. (3)

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3. (a) How a SCR can also be used as a series inverter ? Explain. (5)
- (b) Explain a chopper ? Explain the working of step up chopper. (7)
- (c) A dc chopper circuit connected to 110 V d.c. source supplies an inductive load having 50 mH in series with a resistance of  $7\Omega$ . A freewheeling diode is placed across the load. The load current varies between the limits of 12A and 14A. Determine the time ratio of the chopper. (3)
4. (a) Discuss need to trigger a gate of SLR. Explain the RC firing circuit used for triggering the gate. (7)
- (b) What is UPS ? Where is it used ? Give the circuit and waveforms for short break UPS. (5)
- (c) How does a regulated power supply work ? Give its applications. (3)
5. (a) Find the load and full-load speeds for a four-pole, 220V and 20KW, shunt motor having the following data: field current = 5A, armature resistance = 0.04 ohms, flux per pole = 0.04 Wb, number of armature conductors 160, two circuit wave connection, full load current = 95A, no load current = 9A. Neglect armature reaction. (6)
- (b) How is AC generator different from DC generator ? (5)
- (c) Name a constant speed dc motor and explain why is it so ? (4)
6. (a) Why all-day efficiency is always less than ordinary efficiency in a transformer ? (5)
- (b) What is torque and speed relationship for induction motor in braking, motoring and generating zone ? (6)
- (c) When an induction motor can be called synchronous motor ? (4)
7. (a) A 20 kW lighting transformer of ordinary efficiency 95% is on full load for 6 hours a day. Find the all-day efficiency, if the full-load losses are equally divided between copper and iron. (5)
- (b) Explain briefly various types of stepper motor. (6)
- (c) Compare servomotors with large industrial motors. (4)