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Question Paper Code : 57313

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Third Semester

Electronics and Communication Engineering

EE 6352 – ELECTRICAL ENGINEERING AND INSTRUMENTATION

(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Faraday's law of electromagnetic induction is used in what type of DC machine ?
Write its principle of operation.
2. Why is the starting current very high in a dc motor ?
3. Write down the EMF equation of a transformer.
4. Draw the phasor diagram of a transformer on no load.
5. Define "Slip" of a 3-phase induction motor.
6. A 3 phase, 50 Hz, 20 poles salient pole alternator must be run at what speed if it has star connected stator winding ?
7. How is the dynamic behaviour of a measuring system determined ? Name any common inputs to the system.
8. Write the principle of an LVDT.
9. Where do you use a Q-meter ?
10. For measuring unknown capacitance, what type of bridges are employed ?

PART – B (5 × 16 = 80 Marks)

11. (a) A 220 V dc shunt motor draws 4.5 A on no load and runs at 1000 rpm. Resistance of the armature winding and shunt field winding is 0.3 and 157 ohms respectively. Calculate the speed when loaded and drawing a current of 30 A. Assume that the armature reaction weakens the field by 3%.

OR

- (b) Discuss the characteristics of DC generators and their theory of operation.

12. (a) (i) What is an ideal transformer and why the efficiency of a transformer is so high? (8)
(ii) Summarise the various transformer losses and write a note on auto transformers. (8)

OR

- (b) (i) What is known as the regulation of a transformer? (6)
(ii) The maximum efficiency of a 500 kVA, 3000/500 V, 50 Hz single phase transformer is 98% and occurs at 3/4 full load unity power factor. If the impedance is 100%, calculate the regulation at full load 0.8 power factor lagging. (10)

13. (a) Explain the construction of the three phase induction motor. What are its types and give the equivalent circuit of the same. (16)

OR

- (b) (i) Enlist the various methods of starting of synchronous motors and derive the torque equation. (8)
(ii) Write down the principle of operation of alternators and their construction details. (8)

14. (a) (i) How are the various transducers classified? (8)
(ii) Summarise the various errors you encounter in measurement. (8)

OR

- (b) (i) Point out the advantages and disadvantages of RTD. (8)
(ii) Explain the working of a Piezo Electric transducer. (8)

15. (a) With neat block diagram explain the operation of storage oscilloscope. (16)

OR

- (b) (i) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at the balance are,
 $C_1 = 0.02 \mu\text{F}$; $R_1 = 510 \text{ k}\Omega$; $R_2 = 4.7 \text{ k}\Omega$ and $R_3 = 120 \text{ k}\Omega$.
Find the series equivalent of unknown impedance. (8)
(ii) Find the equivalent parallel resistance and capacitance that causes a Wien bridge to null with the following component values.
 $R_1 = 2.7 \text{ k}\Omega$; $C_1 = 5 \mu\text{F}$; $R_2 = 22 \text{ k}\Omega$; $R_4 = 100 \text{ k}\Omega$.
The operating frequency is 2.2 kHz. (8)