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Question Paper Code : 80370

02/11/16

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 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. Write the working principle of a DC motor.
2. Mention the types of DC series motor.
3. What is regulation of a transformer?
4. Derive the condition for maximum efficiency of single phase transformer.
5. What is slip in an induction motor?
6. Calculate the pitch factor for the winding with 36 slots 4 poles, coil span 1 to 8.
7. Define accuracy and resolution of a measuring instrument.
8. Write the principle of piezoelectric transducer.
9. Compare the important features of analog and digital instruments.
10. Define the Q factor.

PART B — (5 × 13 = 65 marks)

11. (a) With a neat diagram, explain the construction and function of different parts of a DC machine in detail. (13)

Or

- (b) Explain in detail how the shunt motor behaves as a constant speed motor and the series motor as a variable speed motor. Hence discuss the applications of shunt, series and compound motor. (13)

12. (a) Explain open circuit and short circuit test on a single phase transformer. Deduce its equivalent circuit. (13)

Or

- (b) Explain the operation of the transformer on load condition and draw the phasor diagram for lagging power factor. (13)
13. (a) Explain the working principle of a 3 phase induction motor. Hence derive the expression for its torque and obtain the condition for maximum torque. (13)

Or

- (b) (i) Explain the working principle of a synchronous motor. (6)
(ii) Describe the constructional features of salient pole and smooth cylindrical type rotor of an alternator. (7)
14. (a) (i) Discuss the causes and method to minimize different types of errors. (8)
(ii) Compare the features of RTD, Thermocouple and thermistor. (5)

Or

- (b) (i) Write short notes on capacitor Microphone. (5)
(ii) With equivalent circuit, Obtain the transfer function of LVDT. (8)
15. (a) Discuss the capacitance measurement using Wien Bridge and Schering's bridge and compare the merits & limitations of both the bridges.

Or

- (b) With the block diagram, Explain the operation of storage oscilloscope.

PART C — (1 × 15 = 15 marks)

16. (a) (i) A 15 kVA, 2000/200 V transformer has an iron loss of 250W and full load copper Loss 350W. During the day it is loaded as follows :

No. of hours	Load	Power factor
9	$\frac{1}{4}$ Load	0.6
7	Full load	0.8
6	$\frac{3}{4}$ load	1.0
2	No load	-

Calculate the all-day efficiency. (10)

- (ii) A 4-pole lap wound DC shunt generator has a useful flux/pole of 0.06 Wb. The armature winding consists of 200 turns, each turn having a resistance of 0.003Ω . Calculate the terminal voltage when running at 1000 rpm if armature current is 45A. (5)

Or

- (b) (i) What resistance range must resistor R_3 have in order to measure unknown resistor in the range of 1 – 100 k Ω using a Wheatstone bridge? Given $R_1 = 1\text{ k}\Omega$ and $R_2 = 10\text{ k}\Omega$. (7)
- (ii) Obtain the expression for frequency of Wien's bridge under balanced condition. (8)