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Total No. of Questions : 09

B.Tech. (Sem.–1,2)

BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Subject Code : EE-101 (2004-2010 batch)

Paper ID : [A0126]

Time : 3 Hrs. **Max. Marks : 60**

INSTRUCTION TO CANDIDATES :

1. **SECTION-A is COMPULSORY.**
2. **Attempt any FIVE questions SECTION-B & C.**
3. **Select at least TWO questions each from SECTION-B & C.**

SECTION-A **(10 × $1^1/_2$ = 15 Marks)**

l. Answer the following sub-question to the point :

(a) What are the quantities on which resistance of a linear circuit depends? Also write their relationship?

(b) State Kirchhoff's Laws for a linear bilateral DC circuits.

(c) Write the delta equivalent of a star connected resistances.

(d) Prove relationship between r.m.s. and mean value of sine wave.

(e) Write any four magnetic and electric circuit analogous quantities.

(f) Explain the necessity of damping in analog instruments.

(g) Explain in brief potentiometric transducer.

(h) Draw and explain characteristic of Zener-diode.

(i) Draw pin diagram of IC 555.

(j) Explain any truth table as applicable to digital electronics.

SECTION-B **(8 Marks each)**

2. Derive an expression for value of α at any temperature other than $t = 0°$, and write an expression for resistance at any temperature if resistance at $t = 0°$, is not known.

3. A ring has a diameter of 20 cm and a cross sectional area of 10 cm^2. The ring is made up of semi-circular sections of cast iron and cast steel, with each joint having a reluctance equal to an air-gap of 0.2mm. Find the AT required to produce a flux of 8 x 10^{-4} wb. The fringing and leakage effects may be neglected.

4. A voltage e(t)=100sin314t is applied to series circuit consisting of 10 Ω resistance, 0.0318 henry inductance, and a capacitor of 63.6 μF. Determine (i) expression for current i(t), (ii) phase angle between voltage and current, (iii) power factor, (iv) active power consumed, (v) maximum value pulsating energy.

5. Explain principle of operation of moving iron instrument and draw its construction.

SECTION C

6. Explain in detail capacitive transducer and list its field of application.

7. A Zener diode is connected across a series combination of battery with range of 20V-50V and a resistance of 820Ω. Voltage across Zener diode is 12V, determine the maximum and minimum Zener current as well as the output voltage, when
   (i) Zener diode is considered to be ideal,
   (ii) Zener resistance of Zener diode is 7Ω.

8. What do you mean by linear IC? Draw Pin diagram of IC 741.

9. Explain in detail R-S flip flop.