Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2020

Subject Name: Fundamental of Electrical Engineering

Subject Code: 4TE01FEE1 Branch: B.Tech (All)

Semester: 1 Date: 10/03/2021 Time: 03:00 To 06:00 Marks: 70

Instructions:

(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1 Attempt the following questions: (14)

1) The statement for Kirchhoff's Voltage law is represented by_____

A) $V_1 + V_2 + V_3 = 0$ B) $R_1 + R_2 + R_3 = 0$

C) $I_1 + I_2 + I_3 = 0$ D) None of the above

2) The element responsible for the flow of electrons in the circuit is_____

A) Switch B) Battery C) Both of them D) None of above

3) Unit of resistivity is_____

A) Weber B) Ohm C) Ohm-metre D) Ohm/metre

4) Current is defined as _____

A) Rate of Flow of Atoms B) Rate of Flow of protons

C) Rate o Flow of Electrons D) All of above

5) Which one of the below element consume the energy?

A) Resistor B) Inductor C) Capacitor D) None of above

6) Which one of the below is not a valid formula?

A) $V = \frac{Q}{C}$ B) $C = \frac{Q}{V}$ C) $Q = CV$ D) $C = \frac{V}{Q}$

7) The average value of a sine wave over a full cycle is _____.

A) 0.707 B) 0 C) 0.636 D) 0.318

8) The ratio of rms. value to average value is called peak factor.

A) True B) False

9) Which one of the below element is also known as current source?

A) Battery B) Analog meters C) Inductor D) None of above

10) The peak value of sine wave is 100 V. Its rms value is _____

A) 63.7 V B) 141.4 V C) 100 V D) 70.71 V

11) When four capacitors of 0.25µF are connected in series , the resultant capacitance will be _____

A) 1 µF B) 0.125 µF C) 0.0625 µF D) 4 µF

12) Which one of the below material has highest resistance?

A) Conductors B) Insulators C) Electrolytes D) Semiconductor

13) A transformer is a _____equipment.

A) Rotating B) Static C) Both rotating and static D) None of the above

14) A wave completes one cycle in *10 µs*. Its frequency will be_____

A) 10 Hz B) 50 Hz C) 10 KHz D) 100 KHz

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** **(14)**

(a) Derive an expression of equivalent resistance for *'n'* number of resistances connected in series. Give the advantages of series connection. **07**

(b) State and explain Ohm's law. Give its limitations **07**

Q-3 **Attempt all questions** **(14)**

(a) State and explain: i) Kirchoff's Current Law ii) Kirchoff's Voltage Law **07**

(b) Give any seven comparisons between magnetic circuit and electrical circuit. **07**

Q-4 **Attempt all questions** **(14)**

(a) Define capacitance. Derive an expression of total capacitance for *n* number of capacitors when connected in parallel. **07**

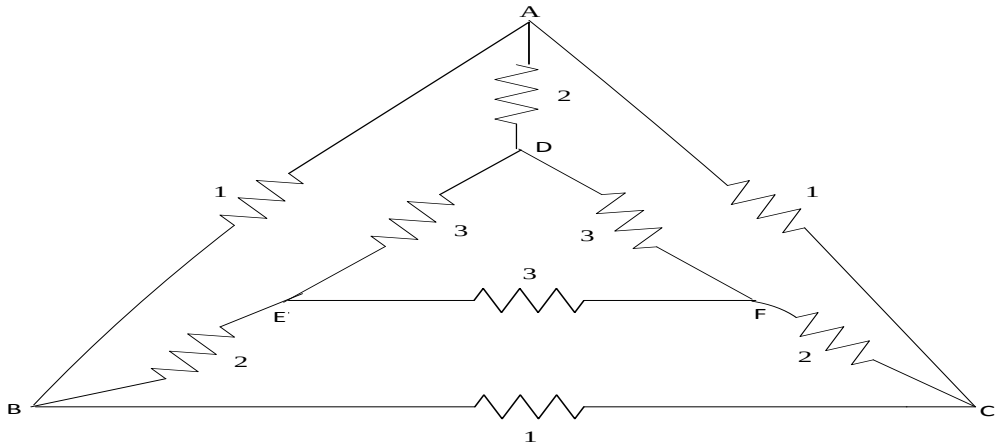
(b) Derive the relationship between the voltage and current for purely resistive AC circuit. Draw the waveforms and phasor diagram for voltage and current. **07**

Q-5 **Attempt all questions** **(14)**

(a) Obtain an expression for the equivalent star network resistance for a given delta network. **07**

(b) A network of 9 conductors connected A, B, C, D, E, F as shown in figure. Determine the **07**

resistance between A and B.



Q-6 **Attempt all questions** **(14)**

(a) Derive the equation for calculating average value of AC current.

(b) Derive the relationship between the voltage and current for purely inductive AC circuit. Draw the waveforms and phasor diagram for voltage and current.

Q-7 **Attempt all questions** **(14)**

(a) Explain the following sinusoidal function terminology. **07**

i) Amplitude ii) Angular Frequency iii) Time period

(b) Derive the relationship between the voltage and current for AC series R-C circuit. Draw the waveforms and phasor diagram for voltage and current. **07**

Q-8 **Attempt all questions** **(14)**

(a) Derive the emf equation $e = 4.44\,fN\phi_m$ for a single phase transformer Where f= frequency of supply, N= number of turns either primary or secondary side, ϕ_m = maximum flux in the core. **07**

(b) For a series RLC circuit, derive the equation for series resonance frequency $f = \dfrac{1}{2\pi\sqrt{LC}}$. **07**