

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.
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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



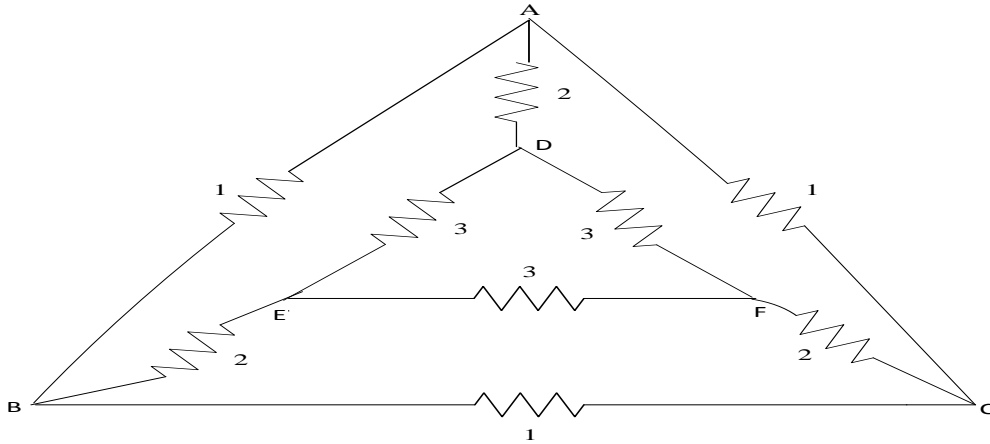
- 9) Which one of the below element is also known as current source?
 A) Battery B) Analog meters C) Inductor D) None of above
- 10) The peak value of sine wave is 100 V. Its rms value is _____
 A) 63.7 V B) 141.4 V C) 100 V D) 70.71 V
- 11) When four capacitors of $0.25\mu\text{F}$ are connected in series , the resultant capacitance will be _____
 A) $1\mu\text{F}$ B) $0.125\mu\text{F}$ C) $0.0625\mu\text{F}$ D) $4\mu\text{F}$
- 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 $10\mu\text{s}$. 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**
 Derive the relationship between the voltage and current for purely resistive AC circuit. **07**
 (b) 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 $e = 4.44 f N \phi_m$ for a single phase transformer Where $f =$ frequency of supply, $N =$ number of turns either primary or secondary side, $\phi_m =$ maximum flux in the core. **07**
- (b) For a series RLC circuit, derive the equation for series resonance **07**
- frequency $f = \frac{1}{2\pi\sqrt{LC}}$.

