Enroll. No._____

MARWADI UNIVERSITY
MU-FOT
CE-FOT1 (MU), IT-FOT1 (MU)
Semester 1 - Winter

Subject : ELEMENTS OF ELECTRICAL ENGINEERING (01EE0101)
Date : 10-Feb-2022 **Time : 3 Hours** **Total Marks : 100**

Instructions :

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Que.1 Answer the following objectives **[10]**
(A)

(1) If a sinusoidal wave has a frequency of 50 Hz with 30 A r.m.s. the current which of the following equation represents this wave?
(A) 42.42 sin 314 t
(B) 60 sin 25 t
(C) 30 sin 50 t
(D) 84.84 sin 25 t

(2) The frequency of domestic power supply in India is
(A) 200 Hz
(B) 100 Hz
(C) 60 Hz
(D) 50 Hz

(3) The period of a sine wave is 0.02 seconds. Its frequency is
(A) 20 Hz
(B) 30 Hz
(C) 40 Hz
(D) 50 Hz

(4) If the value of *C* in a series *RLC* circuit is decreased, the resonant frequency
a) Is not affected
b) Increases
c) Is reduced to zero
d) Decreases

(5) Inductance opposes ..... in current in a circuit.
a) only increase
b) only decrease
c) change
d) none of the above

(6) Five 2 V cells are connected in parallel. The output voltage is
(a) 10 V

(6) 1.5 V
(c) 1.75 V
(d) 2 V

(7) At resonant frequency, the voltage across capacitor is _____ the voltage across inductor.
a) greater than or equal to
b) greater than
c) equal to
d) less than

(8) If there are 8 nodes in network, we can get ____ number of equations in the nodal analysis
a) 9
b) 8
c) 7
d) 6

(9) Form factor for a sine wave is
(A) 1.414
(B) 0.707
(C) 1.11
(D) 0.637

(10) As compared to the constant-current system, the constant-voltage system of charging a lead-acid cell has the advantage of
(a) reducing time of charging
(b) increasing cell capacity
(c) both (a) and (b)
(d) avoiding excessive gassing

Que.1 (B) Answer the following questions. **[10]**

(1) Define the Ohm's law.

(2) What is temperature co-efficient of resistance?

(3) 100 V lamp has a hot resistance of 250 Ω. Find the current taken by the lamp and its power rating in watts. Calculate also the energy it will consume in 24 hours.

(4) Define Electric Potential.

(5) Write Kirchhoff's Voltage law. Give the Sign Convention for DC supply.

(6) Draw the Voltage and current waveform for alternating voltage applied to pure Capacitor

(7) Define Resistance and list the factor effecting the value of resistance.

(8) Draw the symbol of Cell and Battery.

(9) Define Bandwidth.

(10) When alternating voltage applied to Pure Inductor what is phase difference between Voltage and current?

Que.2

(A) Derive the equations for Dynamically induced emf with proper diagram. [8]

(B) Three voltages are represented by [8]

$e_1 = 20 \sin wt$,

$e_2 = 30 \sin (wt - 45^o)$

$e_3 = 40 \cos (wt + 30^o)$

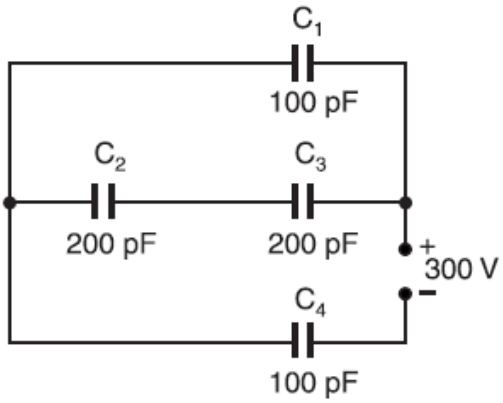
Find the expression for the resultant addition of voltage. Represent them by appropriate vectors.

OR

(B) Determine (i) the average value (ii) r.m.s. value of a symmetrical square wave. Also find the form factor and peak factor. [8]

Que.3

(A) Obtain the equivalent capacitance for the network shown in Fig. For 300 V d.c. supply, determine the charge and voltage across each capacitor. [8]



(B) Explain in Phase and out of the phase in the AC signal. [4]

(C) What do you mean by self inductance? Derive the equation of Self-inductance. [4]

OR

(A) A resistance R and a 4 μF capacitor are connected in series across a 200 V d.c. supply. Across the capacitor is connected a neon lamp that strikes at 120 V. Calculate the value of R to make the lamp strike after 5 seconds. [8]

(B) A capacitor has a capacitance of 100 microfarads which is connected across a 200 V, 50 Hz supply. Find (a) capacitive reactance, (b) rms value of current [4]

(C) An inductive coil having negligible resistance and 0.1 henry inductance is connected across a 200 V, 50 Hz supply. Find (a) inductive reactance, (b) rms value of current [4]

Que.4

(A) What do you mean by Coupling Co-efficent ? Drieve the equation of Coupling co-efficient. [8]

(B) Define Average and RMS value of Alternating Quantities. Derive the average value and rms value of pure sine wave. [8]

OR

(A) Give comparisons between Electric circuit and Magnetic Circuit. [8]

(B) Derive the expression for the rise of current in an inductive circuit when a DC supply is switched on to it. [8]

Que.5

(A) Define the unbalanced star and delta connected load. [6]

(B) Explain the grouping of cells [6]

(C) Write safety precautions for electrical Applications [4]

OR

(A) An alternating current i is given by ; [6]
$i = 141{\cdot}4 \sin 314\ t$
Find (i) the maximum value (ii) frequency (iii) time period and (iv) the instantaneous value when t is 3 ms.

(B) Derive the expression for converting Star connected network into Delta. [6]

(C) Draw the Voltage current and power wave form for AC voltage applied to Purely resistive Circuit [4]

Que.6

(A) Derive the equation of Current when alternating Voltage applied to pure R-L Series circuit . and Draw Voltage current and Power wave form. [8]

(B) Draw and explain R-C series circuit with Phasor and waveform. [4]

(C) Draw the Voltage current and power wave form AC voltage applied to Purely Inductive Circuit [4]

OR

(A) A resistance R and a 4 μF capacitor are connected in series across a 200 V d.c. supply. Across the capacitor is connected a neon lamp that strikes at 120 V. Calculate the value of R to make the lamp strike after 5 seconds. [8]

(B) Draw Power Triangle for an AC circuit. Define Active, Reactive and Apparent Power [4]

(C) Write the characteristics of series resonance. [4]

---Best of Luck---

MARWADI UNIVERSITY
MU-FOT
CE-FOT1 (MU), IT-FOT1 (MU)
Semester 1 - Winter

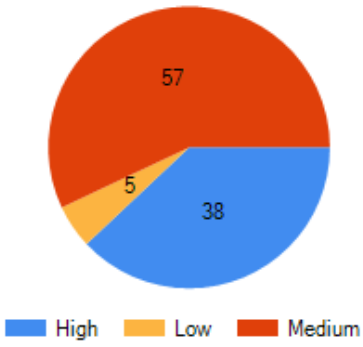
Subject : ELEMENTS OF ELECTRICAL ENGINEERING (01EE0101)

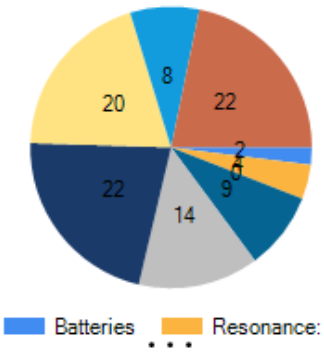
Date : 10-Feb-2022 **Time : 3 Hours** **Total Marks : 100**

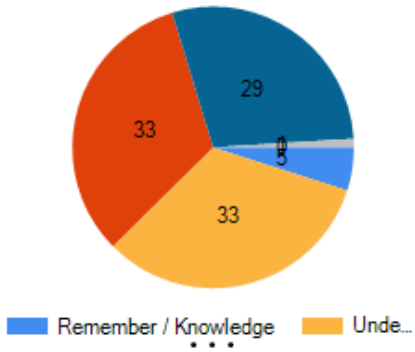
Difficulty Level	Weightage Recommended	Weightage Actual	No of Question	Total Marks	Question List
High	20	38.37	12	66	1(A), 1(B), 2(B), 3(A), 4(A), 4(B), 5(A), 6(A)
Low	20	4.65	5	8	1(A), 1(B), 6(C)
Medium	60	56.98	28	98	1(A), 1(B), 2(A), 2(B), 3(B), 3(C), 4(B), 5(A), 5(B), 5(C), 6(A), 6(B), 6(C)

Module Name	Weightage Recommended	Weightage Actual	No of Question	Total Marks	Question List
Batteries	3	1.74	3	3	1(A), 1(B)
Resonance:	5	4.07	4	7	1(A), 1(B), 6(C)
Safety and Protection	6	0.00	0	0	
Three Phase Systems:	7	9.30	3	16	5(A), 5(B), 5(C)
Electrostatics and Capacitance:	13	13.95	3	24	3(A), 6(A)
Fundamental of AC Quantities:	15	22.09	9	38	1(A), 2(B), 3(B), 4(B), 5(A)
Analysis of AC circuits:	16	19.77	9	34	1(B), 3(B), 3(C), 5(C), 6(A), 6(B), 6(C)
Fundamental of DC circuits:	17	7.56	8	13	1(A), 1(B), 5(B)
Magnetic Circuits and Electromagnetics:	18	21.51	6	37	1(A), 2(A), 3(C), 4(A), 4(B)

Blooms Taxonomy	Weightage Recommended	Weightage Actual	No of Question	Total Marks	Question List
Remember / Knowledge	20	5.23	6	9	1(B), 5(C)
Understand	30	32.56	18	56	1(A), 1(B), 2(A), 3(B), 3(C), 5(A), 5(B), 5(C), 6(B), 6(C)
Apply	25	32.56	10	56	1(A), 1(B), 3(A), 3(B), 3(C), 4(A), 4(B), 5(B), 6(A)
Analyze	15	29.07	10	50	1(A), 1(B), 2(B), 4(A), 4(B), 5(A), 6(A)
Evaluate	10	0.58	1	1	1(A)
Higher order Thinking	0	0.00	0	0	


57
5
38
High
Low
Medium


8
22
20
2
22
9
14
Batteries
Resonance:


29
33
33
Remember / Knowledge
Unde...