Enrollment No:	Exam Seat No:	
	C.U.SHAH UNIVERSITY	
	Summer Examination-2019	

Sub	iect	Name:	Fund	amenta	l of	Electrical	Engine	ering
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Subject Code: 4TE01FEE1 Branch: B.Tech (All)

Semester: I Date: 16/03/2019 Time: 02:30 To 05:30 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 resistivity of the conductor depends onof the conductor.	
		A) Area B) Length C) Type of material D) None of these	
	2)	Resistance of metalic conductor is propotional to its area.	
		A) Directly B) Inversly	
	3)	How many coulombs of charge flow through a circuit carrying a current of 10 A	A in
		1 minute?	
		A) 10 B) 600 C) 6000 D) 1200	
	4)	The unit of permeability is	
		A) Henry/Metre B) Weber C) Henry D) Metre/ Henry	
	5)	A capacitor carries a charge of 0.1 C at 5 V. Its capacitance is	
		A) 0.2 F B) 0.5 F C) 0.05 F D) 0.02 F	
	6)	To obtain a high value of capacitance, the permittivity of dielectric medium sho	ould
		be	
		A) Low B) Zero C) High D) Unity	
	7)	If a pure inductor is connected across the ac source, the average power taken by	the
		inductor isWatt	
		A) A few B) Zero C) Hundred D) Maximum	
	8)	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	
	9)	If $e_1 = A \sin \omega t$ and $e_2 = B \sin(\omega t + \phi)$, then	



		A) e_1 leads e_2 by ϕ B) e_2 lags e_1 by ϕ C) e_2 leads e_1 by ϕ D) e_1 is in phase with e_2					
	10)	At higher frequencies, the value of capacitive reactance					
		A) Decreases B) Remains same C) Increases D) Depends on applied voltage					
	11)	In series RLC circuit what is the power factor just below the resonance frequency?					
		A) Lagging B) Leading C) Unity D) Zero					
	12)	In a balanced 3-phase delta connected system, Line voltage is equal to Phase					
		Voltage.					
		A) True B) False					
	13)	A transformer transforms					
		A) Voltage B) Current C) Frequency D) Voltage and Current					
	14)	For a step up transformer, transformation ratio K is					
		A) $=0$ B) >1 C) $=1$ D) < 1					
	pt any	four questions from Q-2 to Q-8	(4.A)				
Q-2	(a)	Attempt all questions Define temperature co-efficient of resistance. Prove that $\alpha_t = \frac{\alpha_0}{1+\alpha_0 t}$, where $\alpha_0 = \frac{\alpha_0}{1+\alpha_0 t}$	(14) 07				
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		temperature co-efficient of resistance at 0° C.					
	(b)	Explain the effect of temperature on the resistance of the following.	07				
		i) Pure metals ii) Semiconductors					
		iii) Electrolytes iv) Insulators					
0.3		Attempt all questions	(14)				
Q-3			(14)				
	(a)	State Faraday's first law and second law electromagnetic induction. Derive the					
		equation of induced emf $e = N \frac{d\phi}{dt}$. Where N= Number of turns in a coil, ϕ = flux in					
		the coil.					
	(b)	Derive the expression of inductance for the coupled coil connected in series	07				
Q-4		Attempt all questions	(14)				
	(a)	Define capacitance. Derive an expression of total capacitance for n number of	07				
		capacitors when connected in series.					
	(b)	Derive the expression of energy $E = \frac{1}{2}CV^2$ stored in a electric field of the	07				
		capacitor. Where, C=capacitance of capacitor, V= Voltage across the capacitor.					



Q-5		Attempt all questions	(14)
	(a)	Obtain an expression for the equivalent delta network resistance for a given star network.	07
	(b)	State and explain Kirchhoff's current and voltage law.	07
Q-6	(a)	Attempt all questions Derive the relationship between the voltage and current for purely inductive circuit.	(14)
		Draw the waveforms and phasor for voltage and current.	
	(b)	Define resonance. Derive the expression of the resonance frequency for the series	
		RLC cicuit.	
Q-7	(a)	Attempt all questions Explain the two wattmeter method for the measurement of power for a balanced	(14) 07
		three phase circuit.	
	(b)	Derive the following relation for 3 phase balanced star connection.	07
		i) Relation between line voltage and phase voltage	
		ii) Relation between line current and phase current	
Q-8	(a)	Attempt all questions Derive the emf equation $e = 4.44 fN\phi_m$ for a single phase transformer Where f=	(14) 07
		frequency of supply, N= number of turns either primary or secondary side, ϕ_m =	
		maximum flux in the core.	
	(b)	A single phase transformer has 400 primary turns 1000 secondary turns. The net	07
		cross-sectional area of the core is 60 cm ² . If the primary winding to be connected to	
		a 50 Hz supply at 520 V (rms), Calculate,	
		i) Peak value of the flux density in the core	
		ii) Voltage induced in the secondary winding.	

