



Sanjay Ghodawat University, Kolhapur

2017-18

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

FY B Tech

School of Technology

Department: FY B Tech

FYT 107

Elements of Electrical Engineering

Semester – II

May 2018

End Semester Examination

Time: 3Hrs, Max Marks: 100

June,

Instructions for Students:

27/6/18

- 1) Use of non-programmable calculator is allowed.
- 2) All questions are compulsory.
- 3) Fig. to the right indicates max. marks for the questions.

- | | | Marks | COs |
|-----------|--|-------|------|
| Q1 | Solve the following questions. | | |
| a) | An iron ring has its mean length of flux path as 60cm and its cross sectional area as 15 cm^2 . If the relative permeability is 500. Find the current required to be passed through a coil of 300 turns wound uniformly around it to produce a flux density of 1.2 Tesla. What would be the flux density with the same current if the iron ring is replaced by air core. | 10 | CO 1 |
| b) | State and explain Kirchhoff's current and voltage law with neat diagram. | 06 | CO 1 |
| OR | | | |
| b) | Define the terms and state their SI units: 1. Magnetic Circuit. 2. Magneto motive force. 3. Relative Permeability. 4. Permeability of free space. | 06 | CO 1 |
| Q2 | Solve any Two. | | |
| a) | Sketch the waveforms of voltage, current and power if $V = V_m \sin \omega t$ Volts is applied across series RC circuit. State expression for current and Power. | 08 | CO 2 |
| b) | A series RLC Circuit has a resistance of 50Ω , inductance of 0.1 H and capacitance of $50 \mu\text{f}$ connected in series across single phase 230 Volt, 50 Hz supply. Calculate: (1) Impedance (2) Current (3) Power factor (4) Active & reactive Power consumed by circuit. | 08 | CO 2 |
| c) | With neat circuit diagram and phasor diagram discuss R-L-C series circuit. | 08 | CO 2 |
| Q3 | Solve any Three. | | |
| a) | Obtain relationship between line voltage & line current with phase voltage and phase current in Delta connected circuit. | 06 | CO 3 |

	b)	Draw a circuit diagram of delta connected circuit and prove that 'line current = $\sqrt{3}$ phase current' in balanced star connected circuit.	06	CO 3
	c)	Define and explain: Symmetrical 3 phase supply, phase sequence, 3 phase balanced load.	06	CO 3
	d)	Compare three phase balanced Star connection and Delta connection.	06	CO 3
Q4		Solve any Three.	Marks	COs
	a)	What is the necessity of earthing? Briefly explain Pipe Earthing?	06	CO 4
	b)	Explain construction of HRC fuse. Explain its operation. State advantages of MCB over fuse.	06	CO 4
	c)	Draw single line diagram of typical power system from the point of generation to the point of utilization. Explain why step up transformer is used before transmission.	06	CO 4
	d)	State causes of electrical accidents. Explain in brief electrical safe practices.	06	CO 4
Q5		Solve any Two.		
	a)	With the help of neat diagrams the method of testing a single phase transformer by open circuit and short circuit. How is the efficiency calculated?	08	CO 5
	b)	Derive the EMF equation for single phase transformer.	08	CO 5
	c)	A 6600/220 V , 50 Hz, step down single phase transformer has 1500 turns on its primary side. Find:	08	CO 5
		(i) The secondary turns. (ii) The effective cross sectional area of its core if the maximum flux density is 1.2 Tesla.		
Q6		Solve any Two.		
	a)	Explain with the help of suitable diagram how rotating magnetic field is produced in a Three phase Induction Motor Draw phasor diagram for (1) $\Theta=30^\circ$ (2) $\Theta=60^\circ$	10	CO 6
	b)	Explain the concept of slip (s) in three phase induction motor. Drive the expression for frequency of rotor current. (i.e: $f_r=sf$)	06	CO 6
		OR		
	b)	Explain squirrel cage and wound rotor type induction motor with neat diagram.	06	CO 6
