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F.E Semester-I (Revised Course 2019-20)
EXAMINATION MARCH 2021
Basics Electrical & Electronics Engineering

[Duration : Two Hours] **Total Marks (60)**

Instructions:
1. Answer THREE FULL QUESTIONS with ONE QUESTION FROM EACH PART.
2. Assume suitable additional data if necessary.

Part – A

Q.1 a) Give the analogy between electric and magnetic circuits. (6)

b) Briefly discuss the conventional and non-conventional sources of power generation. (8)

c) A mild steel ring is having a mean circumference of 400cm and cross-sectional area of 500mm^2. It is uniformly wound with a coil of 100 turns around it. The relative permeability is 380. Calculate reluctance of the ring. (ii) the current required to produce a flux of 800 $\mu\, wb$ in the ring. (6)

Q.2 a) Briefly explain the following terms with respect to single phase transformer: (6)
(i) Magnetic leakage (ii) Copper loss (iii) Voltage regulation (iv) efficiency
Also list down the different losses occurring in a transformer.

b) Two resistances 20Ω and 40Ω are connected in parallel. A resistance of 10Ω is connected in series with the combination. A voltage of 200V is applied across the circuit. Draw the circuit. Find the current in each resistance and the voltage across 10Ω residstor. Find also the power consumed in all the resistances. (7)

c) State Maximum Power transfer theorem. Derive the condition for maximum power to be transferred. (7)

Q.3 a) In a star connected, three phases system, derive the relationship between line voltage and phase voltage, line current and phase current and the expression for total power consumed. (8)

b) Define phase difference. With neat waveforms explain the concept of leading and lagging phase angle. Also define the term Power factor. (6)

c) A 6600 / 400 V, single phase 600KVA single phase transformer has 1200 primary turns. Find (i) Transformation ratio, (ii) number of secondary turns (iii) voltage per turn, (iv) secondary current when it supplies a load of 400KW at 0.8 power factor lagging. (6)

Part-B

Q.4	a)	Explain the operation of Zener diode as a voltage regulator.	(6)
	b)	Differentiate between P-type and N-type semiconductors. What are the doping materials used for their formation.	(5)
	c)	With the help of a neat circuit diagram and waveforms, explain the operation of centre tapped full wave diode rectifier.	(6)
	d)	Explain the following terms. (i) Peak Inverse voltage, (ii) Ripple factor	(3)
Q.5	a)	Describe the working of Light Emitting Diode and draw its V-I characteristics.	(6)
	b)	Explain the construction, operation and V- I characteristics of an SCR.	(8)
	c)	Explain the amplifying action of a Bipolar junction Transistor.	(6)
Q.6	a)	Explain the voltage-divider biasing circuit for a Bipolar junction Transistor.	(7)
	b)	Differentiate between Common emitter configuration and common collector configuration of a BJT.	(6)
	c)	Describe the different breakdown mechanisms in a Diode.	(7)

Part - C

Q. 7	a)	Explain the Enhancement mode and Depletion mode of and JFET along with their transfer curves.	(7)
	b)	Describe the construction and characteristics of IGBT.	(8)
	c)	Explain any phase control application of an SCR.	(5)
Q. 8	a)	Derive the expression for instantaneous current and instantaneous power in an AC circuit containing Inductance only. Draw neat and labeled waveforms and phasor diagram.	(8)
	b)	State and explain Kirchhoff's laws	(6)
	c)	Explain the following terms related to magnetism: (i) Magneto motive force (ii) Magnetic potential (ii) Reluctance (iv) Permeability (v) Flux density (v) Magnetic field strength	(6)