Model Question Paper-I/II with effect from 2021 (CBCS Scheme)

USN | | | | | | | | | |

First Semester BE Degree Examination

Subject Title – Basic Electrical Engineering

TIME: 03 Hours **Max. Marks: 100**

Note: Answer any **FIVE** full questions, choosing at least **ONE** question from each **MODULE**.

		Module -1	**Marks**
Q.01	a	Illustrate with examples, Kirchhoff's laws as applied to an electric circuit.	8
	b	Prove that, the circuit efficiency during maximum power transfer from source to load is only 50%.	6
	c	The equation for an AC voltage is given as V= 0.04sin $(2000t+60^{0})$ volts. Determine the frequency, angular frequency and instantaneous voltage when t=160μs.	6
		OR	
Q.02	a	Define R.M.S value of alternating current. Show that its value is proportional to maximum value.	8
	b	A circuit consisting of 12Ω, 18 Ω and 36 Ω respectively, joined in parallel, is connected in series with a fourth resistance. The whole is supplied at 60V and it is found that the power dissipated in 12 Ω resistance is 36 W. determine the value of fourth resistance and the total power dissipated in the group.	6
	c	Justify, why pure inductor does not consume any power when connected across single phase A.C. supply?	6
		Module-2	
Q. 03	a	Demonstrate that, two wattmeters are sufficient to measure power in a three phase balanced star connected circuit with the help of neat circuit diagram and phasor diagram.	8
	b	A circuit consists of a resistance of 20Ω, an inductance of 0.05H connected in series. A supply of 230V at 50 Hz is applied across the circuit. Determine the current, power factor and power consumed by the circuit.	6
	c	Deduce the relationship between the phase and the line voltages of a three phase star connected system.	6
		OR	
Q.04	a	Develop an equation for the power consumed by an R-L series circuit. Draw the waveforms of voltage, current and power.	8
	b	When a three phase balanced impedances are connected in star, across a three phase, 415V, 50Hz supply, the line current drawn is 20A, at a lagging p.f of 0.4. Determine the parameters of the impedance in each phase.	6
	c	A balanced 3 phase star connected system draws power from 440V supply. The two wattmeters connected indicate 5KW and 1.2 KW. Determine power, power factor and current in the circuit.	6
		Module-3	
Q. 05	a	Explain the principle of operation and construction of a dc generator.	8
	b	How back emf regulates the armature current in a D.C. Motor? Explain with relevant equations.	6
	c	A 4 pole, 1500 r.p.m. D.C. generator has a lap wound armature, having 32 slots and 8 conductors per slot. If the flux per pole is 0.04Wb, datermine the E.M.F. induced in the armature. What would be the E.M.F induced, if the winding is wave connected.	6

		OR	
Q. 06	a	Discuss various types of losses in a transformer.	8
	b	With usual notations, develop the torque equation of D.C. motor.	6
	c	A 250 KVA, 11000/415 volts, 50 Hz single phase transformer has 80 turns on the secondary. Calculate i) Rated primary and secondary currents ii) Number of primary turns iii) Maximum value of flux in the core iv) Voltage induced/turn on secondary.	6
		Module-4	
Q. 07	a	How rotating magnetic field is set up in case of three phase induction motor? Illustrate with neat figures.	8
	b	What is slip of an induction motor and derive expression for frequency of rotor current in terms of supply frequency.	6
	c	A 12 pole 3 phase alternator is coupled to an engine running at 500 rpm. It supplies an induction motor which has a full load speed of 1440 rpm. Determine the percentage slip and the number of poles of the motor.	6
		OR	
Q. 08	a	With neat sketches, explain the construction of two types of synchronous generator.	8
	b	Develop the E.M.F. equation of synchronous generator.	6
	c	A 12 pole, 500 rpm star connected alternator has 48 slots with 15 conductors per slot. The flux per pole is 0.02 Wb and is distributed sinusoidally. The winding factor is 0.97. Calculate the line e.m.f.	6
		Module-5	
Q. 09	a	What is electric power supply system? Draw a single line diagram of a typical a.c. power supply scheme.	8
	b	What are the desirable characteristics of a tariff and explain two part tariff.	6
	c	A consumer has a maximum demand of 200 kW at 40% load factor. If the tariff is Rs. 100 per kW of maximum demand plus 10aise per kWh, Find the overall cost per kWh.	6
		OR	
Q. 10	a	Explain the working principle of fuse and MCB.	6
	b	What is earthing? Why earthing is required? With the help of neat sketch, explain plate earthing.	8
	c	Write a short note on precautions against an electric shock.	6

Table showing the Bloom's Taxonomy Level, Course Outcome and Program Outcome

Question		Bloom's Taxonomy Level attached	Course Outcome	Program Outcome
Q.1	(a)	L2	C01	PO1, P02,P12
	(b)	L3	C01	PO1, P02,P03,P08,P12
	(c)	L3	C01	PO1,P02,P03
Q.2	(a)	L4	C01	PO1,P02,P03
	(b)	L3	C01	PO1,P02,P03,P12
	(c)	L4	C01	PO1,P02,P03,P12
Q.3	(a)	L3	C01	PO1,P02,P03,P08,P12
	(b)	L3	C01	PO1,P02,P03,P12
	(c)	L3	C01	PO1,P02,P03,P12
Q.4	(a)	L3	C01	PO1,P02,P03,P12

	(b)	L3	C01	PO1,P02,P03,P12
	(c)	L3	C01	PO1,P02,P03,P08,P12
Q.5	(a)	L2	C02	PO1,P02,P08,P09,P12
	(b)	L3	C02	PO1,P02,P03,P12
	(c)	L4	C02	PO1,P02,P12
Q.6	(a)	L3	C02	PO1,P02,P06,P08,P12
	(b)	L4	C02	PO1,P02,P12
	(c)	L3	C02	PO1,P02,P08
Q.7	(a)	L3	C02	PO1,P02,P08,P12
	(b)	L3	C02	PO1,P02,P08,P12
	(c)	L3	C02	PO1,P02,P12
Q.8	(a)	L4	C02	PO1,P02,P08,P09,P12
	(b)	L3	C02	PO1,P02,P08,P12
	(c)	L4	C02	PO1,P02,P12
Q.9	(a)	L3	C03	PO1,P02,P08,P12
	(b)	L3	C04	PO1,P02,P08,P09,P11,P12
	(c)	L4	C04	PO1,P02,P12
Q.10	(a)	L3	C04	PO1,P02,P08,P12
	(b)	L4	C04	PO1,P02, P07,P8,P12
	(c)	L3	C04	PO1,P02,P07,P08,P12

Bloom's Taxonomy Levels	**Lower order thinking skills**		
	Remembering(knowledge):L_1	Understanding Comprehension): L_2	Applying (Application): L_3
	Higher order thinking skills		
	Analyzing (Analysis): L_4	Valuating (Evaluation): L_5	Creating (Synthesis): L_6