Hall Ticket Number:

Code No. : 12215 N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

B.E. II-Semester Main & Backlog Examinations, September-2022

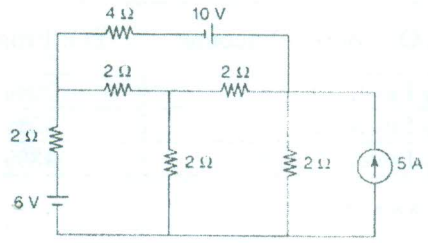
Basic Electrical Engineering

(Common to CSE, AIML, E.C.E, **O : Mech.**)

Time: **3 hours** Max. Marks: **60**

*Note: Answer all questions from **Part-A** and any **FIVE** from **Part-B***

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	State Kirchhoff's laws?	2	1	1	1
2.	Write the statement for Superposition and Tellegen's Theorems.	2	1	1	1
3.	What is power triangle? Give the expressions and interrelationships of real, reactive and apparent powers.	2	1	2	1
4.	Show the power consumed by a pure capacitor is zero.	2	2	2	2
5.	What are the eddy current losses? How do you minimize them?	2	2	3	1
6.	A 4 pole DC shunt motor takes 22 A from 220 V supply. The armature and field resistances are 0.5Ω and 100Ω, respectively. The armature is lap connected with 300 conductors. If the flux per pole is 20 mWb, calculate i) Speed and ii) Torque.	2	4	3	1,2
7.	A 5 kVA, 50 Hz, single-phase transformer has 500 primary turns, and 1,000 secondary turns. The net cross-sectional area of the core is 50 cm^2. When the primary winding is connected to 500V, calculate: (i) the flux produced in the core of transformer, ((ii) the secondary full-load current.	2	4	4	1,2
8.	Discuss the purpose of electrical Earthing.	2	2	4	1
9.	Explain the working principle of Induction motor.	2	3	5	1
10.	Mention the applications of Stepper motor.	2	1	5	1
	Part-B (5×8 = 40 Marks)				
11. a)	For what type of circuits Thevenin's theorem is applied? Explain the statement of Thevenin's theorem through an example.	3	2	1	1
b)	Using mesh analysis, find the power dissipated by the 4 Ω resistor in the network shown below. 	5	4	1	1,2
12. a)	Define RMS value, Average value, Form Factor, Time period, and Frequency for an alternating current waveform. Also give the expressions of these parameters for a Sinusoidal waveform.	3	1	2	1

Contd... 2

b)	Three equal impedances, each of (8 + j10) ohms, are connected in star configuration. This is further connected to a 440 V, 50 Hz, three-phase supply. Find (a) phase voltage, (b) phase angle, (c) phase current, (d) line current, and (e) active power	5	4	2	1,2
13. a)	Explain the method od speed control suitable for getting speeds above rated rpm for DC shunt motor.	3	2	3	1
b)	A 230V DC shunt motor has an armature resistance of 0.24Ω and field resistance of 85Ω. The motor has 8 poles and 500 wave-connected conductors. The flux per pole is 0.03Wb and if the motor takes 23kW as input, Calculate: i) Total armature power developed, ii) Shaft torque.	5	4	3	1,2
14. a)	Define power factor. Illustrate the need for good power factor in an electrical system?	3	3	4	1
b)	Draw the exact equivalent circuit of a single-phase transformer and draw the phasor diagram of it for a leading power factor load.	5	2	4	1
15. a)	Explain the Torque-Slip characteristics of three phase Induction motor.	3	2	5	1
b)	A 3- phase, 460V, 100 HP, 50Hz, 4-pole induction machine delivers rated output power at a slip of 0.05. Determine the: a) Synchronous speed, b) motor speed, c) Speed of the rotating air gap field, d) Frequency of the rotor current, e) Rated torque	5	4	5	1,2
16. a)	Explain the statement of Maximum Power Transfer Theorem through an example and mention its applications.	4	2	1	1
b)	A circuit is supplied with a voltage of v=250 sin 500t volts and current of i=10 sine(500t-50^0). Determine i) Circuit elements and their values ii) Active power iii) Reactive Power iv) Apparent power	4	4	2	1,2
17.	Answer any ***two*** of the following:				
a)	Derive the EMF equation of DC generator.	4	3	3	1
b)	Why fuse is connected in series with the element to be protected? Discuss with an example.	4	4	4	1
c)	A single-phase 4 kVA transformer has 400 primary turns, and 1,000 secondary turns. The net cross-sectional area of the core is 60 cm^2. When the primary winding is connected to 500V, 50 Hz supply, calculate: (i) the maximum value of flux density in the core, (ii) the flux produced in the core of transformer, (iii) the voltage induced in the secondary winding, and (iv) the secondary full-load current.	4	4	5	1,2

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	32%
iii)	Blooms Taxonomy Level – 3 & 4	48%

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