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Code No. : 14513 N/10

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD

B.E. (Mech. Engg.: CBCS) IV-Semester Main & Backlog Examinations, May-2019

Basics of Electrical & Electronics Engineering

Time: 3 hours

Max. Marks: 60

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Q.No.	Stem of the question	M	L	C	P
Part-A (10 × 2 = 20 Marks)					
1.	Find the current supplied by the battery in the circuit of Fig.1.	2	1	1	1,2
Fig.1.					
2.	Identify the importance of 3 phase circuits.	2	3	1	1
3.	Classify transformers based on the type of construction.	2	4	2	1
4.	Describe the difference between the squirrel cage Induction Motor and Slip ring Induction Motor.	2	1	2	1
5.	Compare half wave and full wave rectifiers.	2	4	3	1
6.	What is a bipolar transistor? How are its terminals named?	2	1	3	1
7.	List out the benefits of negative feedback used in an amplifier design.	2	4	4	1
8.	Write the properties of an ideal Operational Amplifier.	2	1	4	1
9.	Find $(AB36)_{16} + (258C)_{16}$.	2	1	5	1,2
10.	Explain about Universal gates.	2	2	5	1
Part-B (5 × 8 = 40 Marks)					
11. a)	State and explain Kirchhoff's laws. Determine the current supplied by the battery in the circuit shown in Fig.2.	4	1	1	1,2
Fig.2.					

b) Determine the line current in an unbalanced, star-connected load supplied from a symmetrical 3- phase, 440-V system. The branch impedance of the load are $Z_R = 5+j30 \Omega$, $Z_Y = 10+j45 \Omega$ and $Z_B = 10+j60 \Omega$. The phase sequence is RYB.	4	1	1	1,2
12. a) Clearly explain the speed control methods of DC shunt motor.	4	2	2	1
b) Explain about the principle of operation of a 1- Φ split-phase induction motor.	4	2	2	1
13. a) With the help of necessary graphs and sketches explain about SCR characteristics and its applications.	4	2	3	1
b) Compare CB, CC and CE configurations of BJT.	4	4	3	1
14. a) Develop Differentiator and Integrator circuits using Op-amps and explain their operation.	4	3	4	1,2
b) Derive an expression for the output voltage of Inverting and non-inverting OP AMP.	4	2	4	1,2
15. a) Construct the logic diagram of a full subtractor using NAND gates only.	4	3	5	1
b) Explain the principle of clocked RS-flip flop with its logic diagram.	4	2	5	1
16. a) Derive an expression for the total power in a 3-phase circuit in terms of line voltages and line currents. Show that the power is same whether the load is delta connected or star connected.	4	4	1	1
b) "An induction motor cannot run at synchronous speed". Justify	4	5	2	1
17. Answer any <i>two</i> of the following:				
a) With circuit diagram and necessary waveforms explain the operation of full-wave rectifier with capacitive filter.	4	2	3	1
b) Explain with a neat circuit diagram the operation of OP AMP as Adder and Subtractor.	4	4	4	1
c) Explain the working of a clocked Data Flip Flop with neat diagram.	4	2	5	1

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

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60
2	Knowledge on application and analysis (Level-3 & 4)	35
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	05

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