U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

February / March 2025 Semester End Main Examinations

Programme: B.E. **Semester: I / II**
Branch: Common to all Branches **Duration: 3 hrs.**
Course Code: 18EC1ESECE / 18EC2ESECE **Max Marks: 100**
Course: Elements of Electronics Engineering

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1	a)	Explain the VI characteristics of PN junction diode with Shockley's equation.	**08**
	b)	The bridge type rectifier circuits is connected to 230V, 50 Hz supply. (i) Find the d.c. voltage in each case. (ii) PIV for each case for the same d.c. output. Assume the diodes to be ideal.	**08**
	c)	A Ge diode is used in a rectifier circuit and is operating at a temperature of 25^{o} C with a reverse saturation current of 1000μA. Calculate the value of forward current if it is forward biased by 0.22V. Assume the value of η=1 for Ge diode.	**04**

OR

2	a)	A 5V Zener diode has a maximum power dissipation rating of 500mW. If a diode is to be used in a simple regulator circuit to supply a regulated 5V to a load having a resistance of 400Ω, determine the suitable value of series resistor for operation in conjunction with a supply of 9V.	**04**
	b)	What is Regulated power supply? Explain with the help of a block diagram.	**10**
	c)	Explain Bridge rectifier with the help of circuit diagram and waveforms.	**06**

UNIT - II

3	a)	With a neat diagram, explain the input and output characteristics of a transistor in common base configuration.	**10**
	b)	Deduce the relationship between various transistor currents and also α and β of a transistor. In a common emitter transistor circuit, if β = 100 and I_B = 50μA, compute the values of α, I_E and I_C.	**05**
	c)	List out the advantages of Negative Feedback amplifiers.	**05**

OR

4	a)	Explain the operation of BJT as an amplifier with relevant diagrams.	**10**
	b)	Explain BJT as a switch with relevant diagrams.	**10**

UNIT - III

5 a) With a neat block diagram describe the function of each block of an op-amp. **05**

b) Derive the output expression of an operational amplifier as an inverting summing amplifier. A sinusoidal signal with peak value of 6mV and 2 KHz is applied to the input of an ideal op-amp integrator with R_1= 100KΩ, C_f = 1μF. Find the output voltage. **07**

c) Draw the circuit diagram of an op-amp voltage follower and explain. What are the reasons for using a voltage follower? **08**

OR

6 a) Discuss the properties of an Ideal op-amp. **04**

b) Derive the output expression of an operational amplifier as an inverting Integrator and Differentiator Circuit. **10**

c) Describe the working principle of Colpitts oscillator with relevant diagrams and circuits. **06**

UNIT - IV

7 a) A logic circuit has 3 inputs A, B, C and one output Y. Y=B XOR C when A=0, and Y=C when A=1. Simplify the output expression and realize the same using only NAND gates. **10**

b) Simplify the following using K-map and realize using minimum number of Basic gates. (i) f(A,B,C) = Σm(0,2,3,4,5,6) (ii) f(x,y,z) = Σm(0,1,3,4,5,7) **05**

c) Design a Half Adder Circuit using only NAND gates. **05**

OR

8 a) A logic circuit has 3 inputs X, Y, Z and one output F. F=X EX-NOR Y when Z=0, and F=Y when Z=1. Simplify the output expression and realize the same using only NOR gates. **10**

b) Simplify the following using K-map and realize using minimum number of Basic gates. (i) f(A,B,C) = Σm(0,2,4,6) (ii) Y(A, B, C) = Σm (1,3,5,7) **05**

c) Design a Full adder using Half Adder and OR gates. **05**

UNIT - V

9 a) Highlight the features of Digital Communication system with the help of a neat block diagram. **09**

b) Illustrate the evolution of cellular communication system. **06**

c) Summarize the different types of networks used in Computer networks. **05**

OR

10 a) Compare Analog and Digital communication systems. **10**

b) What is IOT? explain the concept through a block diagram. **10**

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