SEE MODEL QUESTION PAPER

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21ELN16

First Semester B.E. Degree Examination, March- 2022

Elements of Electronics Engineering

Time: 3 hrs. **Max. Marks: 100**

Note: Answer any Five full questions, choosing ONE full question from each module.

Q. No.			Marks
		MODULE - 1	
1	a)	Draw the Block diagram of Regulated Power Supply and Mention the function of each Block.	8
	b)	With necessary waveforms and circuit diagram, explain the working Principle of Full wave bridge rectifier.	7
	c)	List the applications of Light emitting diode and Seven Segment display.	5
2	a)	A Half wave rectifier uses a transformer with turns ratio 2:1 and the load resistance is 500Ω. If the primary voltage is 240 V then Calculate Peak Inverse Voltage and DC load Voltage.	6
	b)	Explain the working principle of Half wave Voltage doubler Circuit.	8
	c)	Compare Half wave Rectifier with Full wave Rectifiers.	6
		MODULE - 2	
3	a)	Discuss the Classification of amplifiers?	6
	b)	Obtain an Expression for DC collector current (I_C) and collector to emitter voltage (V_{CE}) for the Voltage divider bias circuit.	8 6
	c)	An amplifier with negative feedback gives an output of 12.5V with an input of 1.5V. When feedback is removed, it requires 0.25V input for the same output. Find (i) value of voltage gain without feedback and (ii) value of β, if the input and output are in phase and β is real.	
4	a)	Explain the working of transistor based Colpitts oscillator with circuit diagram and write the expression for the frequency of oscillation.	8
	b)	What is feedback? List the advantages and disadvantages of negative feedback.	6
	c)	In a Hartley oscillator if L_1 = 0.1mH, L_2 = 10uF and mutual inductance between the coils equal to 20μH. Calculate the value of capacitor C of the oscillator circuit to obtain frequency of 4110KHz and also find the condition for sustained oscillations.	6
		MODULE - 3	
5	a)	Define the following terms with respect to OP-AMP (i) CMRR (ii) Slew rate (iii) Input Bias Current (iv) Supply Voltage Rejection Ratio	8 6 6
	b)	Design an adder circuit for the output voltage $V_0 = -[2V_1 + 3V_2+5V_3]$ using OP-AMP. Assume R_f = 10KΩ.	
	c)	Obtain an expression for the output voltage of an Inverting Amplifier using OP-AMP	
6	a)	Obtain an expression for the output voltage of an Differentiator using OPAMP	8
	b)	Determine the maximum allowable value of input voltage (Vin) for the inverting amplifier having R_1 = 100KΩ, R_f = 20KΩ, R_L = 5 KΩ and output voltage is 8V. Assume gain is 200.	6
	c)	Obtain the expression for output voltage of a Differential amplifier using OP-AMP.	6

MODULE - 4

7	a)	State and prove Demorgan's theorem for 2- variables.	6
	b)	Design a half adder circuit and realize using logic gates	6
	c)	Explain the working principle of SR- Latch using NAND gates	8
8	a)	Deduce a Full adder using two half adders and write the truth table and logical expressions.	8
	b)	Explain the working of an SR flip-flop with logic diagram and truth table.	7
	c)	List the Comparison between Combinational and Sequential logic Circuits.	5

MODULE - 5

9	a)	What is amplitude modulation? Deduce an expression for transmitted power in terms of carrier power.	8
	b)	What is modulation and mention the need for modulation.	7
	c)	A carrier of 1 MHz with 400 watts of its power is amplitude modulated with a sinusoidal signal of 2500 Hz. The depth of modulation is 75%. Calculate (i) the sideband frequencies (ii) the band width (iii) the power in the side bands and (iv)the total power in the modulated wave.	5
10	a)	What is Embedded System? Discuss the Classification of Embedded Systems.	6
	b)	Explain the Elements of Embedded systems.	6
	c)	List the Radio frequency spectrum with applications.	8

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