ECE 22

Reg.No.:								

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7025

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE23 - INDUSTRIAL PSYCHOLOGY
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is group dynamics?	2	K1	CO1
2.	List the feature of group.	2	K1	CO1
3.	What do you mean by 'motivation at work'?	2	K2	CO2
4.	Define ethical leadership.	2	K1	CO2
5.	List the basic individual emotions at workplace.	2	K2	CO3
6.	What are the common sources of work stress?	2	K2	CO3
7.	Explain the types of organizational culture.	2	K1	CO4
8.	How does culture help an organization?	2	K2	CO4
9.	What are the causes of work fatigue?	2	K1	CO5
10.	Define industrial boredom.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	How would you form a group/ team in your organization? Describe the steps to be followed.	13	K2	CO1
		(OR)			
	b)	Discuss in detail the various types of groups in an organization with relevant examples of each.	13	K2	CO1
12.	a)	In Indian context, which motivation theory can be commonly adopted? Justify.	13	K4	CO2

(OR)

	b)	For a manufacturing firm, which leadership style suits for an engineer? Explainthe suitability of the style.	13	K4	CO2
13.	a)	Explain the various dimensions of emotional intelligence in detail and its applicability in the organization.	13	K3	CO3
		(OR)			
	b)	Discuss the commonly followed stress coping strategies to minimize the individual's stress.	13	K3	CO3
14.	a)	Explain the importance of organizational culture. How do they help in maintaining good interpersonal relation?	13	K3	CO4
		(OR)			
	b)	Suggest some ways to strengthen the culture of an organization.	13	K4	CO4
15.	a)	Explain the different types of industrial fatigue? Suggest ways to minimize the same.	13	K2	CO5
		(OR)			
	b)	What are the common causes of industrial boredom? Discuss some effective strategies to minimize the same.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	In a multinational enterprise, the projects are based on contractual basis with the universal clients. Hence, the company's orders are purely based on demand and so has a greater number of contract or temporary workers. How do you motivate these workers whose morale will be down as there is no job security? As a leader, what measures you will take to manage the situation?	15	K4	CO2
		(OR)			
	b)	The Managing Director (MD) of a design engineering company is facing a very high turnover of employees. Training cost for the new comers was high as well as time-consuming which they could not afford. Highly skilled people demanded ever increasing compensation. To retain competitive edge of his company, after consulting his executive managers made the following announcement to the employees: - Every employee is free to demand compensation for him as he deems fit. - There shall be no negotiation, - Those who get 'no' to salary demand shall leave the organization. The above-mentioned process shall be repeated annually. After the first round, employees got what they wanted and total compensation for the company went down and the number of employees reduced. Critically describe the leadership style of MD. If you were in the same position, what would you do?	15	K4	CO2

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Question Paper Code: 7030

B.E./B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Seventh Semester
Electronics and Communication Engineering
U19ECE37 - MOBILE ADHOC NETWORKS
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No	Questions	Marks	KL	CO
1.	Differentiate Cellular and Adhoc Wireless networks.	2	K1	CO1
2.	Classify the power sources used in sensor networks.	2	K1	CO1
3.	Write any two important goals for MAC protocol.	2	K2	CO2
4.	Classify the MAC protocols.	2	K2	CO2
5.	Sketch the block diagram of a hybrid routing protocol.	2	K2	CO3
6.	What are the major challenges in designing routing protocols?	2	K2	CO3
7.	Identify the ways to maintain the quality of sensor networks.	2	K2	CO4
8.	Comment on the use of natural language passwords directly for cryptographic algorithms.	2	K2	CO4
9.	Mention the applications of wireless fidelity systems.	2	K2	CO5
10.	Write short notes on Meghdoot Architecture.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Explain in detail about Adhoc wireless internet.	13	K2	CO1
		(OR)			
	b)	Discuss about the energy management and deployment consideration of adhoc wireless networks.	13	K2	CO1

12.	a)	Explain in detail the contention based MAC protocol with and without reservation.	13	K2	CO2
		(OR)			
	b)	How MAC layer optimization is achieved with respect to its higher layers and physical layer? Also write its impact on bit rate and power control.	13	K2	CO2
13.	a)	Describe how the packets are transmitted in multiple access collision avoidance protocol.	13	K3	CO3
		(OR)			
	b)	Explain the scheduling table update mechanism in distributed priority scheduling.	13	K2	CO3
14.	a)	Identify the issues in designing a transport layer protocol for adhoc wireless networks.	13	K2	CO4
		(OR)			
	b)	Mention the impact of the failure of proxy nodes in split-TCP.	13	K2	CO4
15.	a)	Explain the salient features of 802.11g IEEE standard in detail.	13	K2	CO5
		(OR)			
	b)	Explain in detail the operation of UWB Systems.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	With suitable diagrams explain the transmission power management and system power management schemes.	15	K3	CO5
		(OR)			
	b)	Outline the various Qos architectural frameworks and explain them in detail.	15	K3	CO4

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Question Paper Code: 7019

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Electronics and Communication Engineering
UI9EC518 – CONTROL SYSTEMS
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

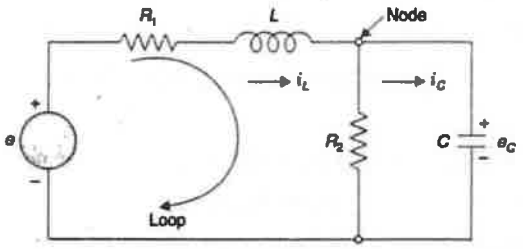
(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	For what kind of systems does the superposition principle hold?	2	K2	CO1
2.	What determines the node variable value in the signal flow graph?	2	K3	CO1
3.	Obtain the steady-state error for a unit step input.	2	K3	CO2
4.	Why is it preferred to set the damping factor of a control system to be sufficiently less than unity (suppose 0.7)?	2	K3	CO2
5.	What is the asymptotic phase plot of a single factor $\frac{1}{j\frac{\omega}{\omega_c}+1}$?	2	K3	CO3
6.	Consider the loop transfer function $\frac{K(s+6)}{(s+3)(s+5)}$. In the root locus diagram, where will the centroid be located?	2	K3	CO3
7.	Distinguish between the Nyquist contour and GH(s) contour.	2	K3	CO4
8.	Identify the type and order of the system with the open-loop transfer function $\frac{1}{s(s+1)}$.	2	K3	CO4
9.	Consider a system if represented by state space equation and $x_1(t) = x_2(t)$, then check whether the system is observable or controllable.	2	K3	CO5
10.	Write the significance of Kalman's test.	2	K2	CO5

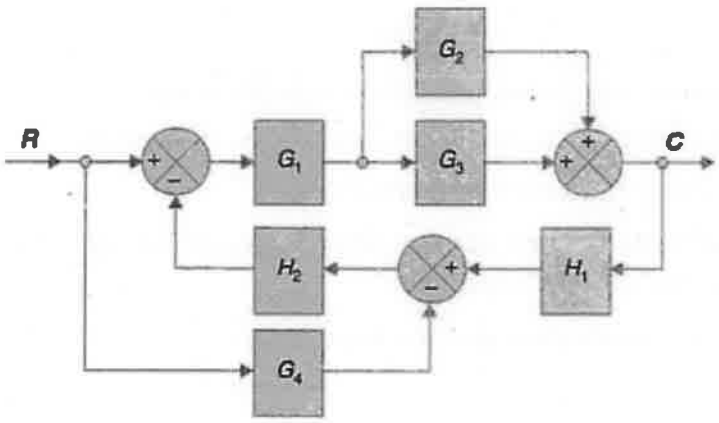
PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Consider the circuit given in the figure below.			



		i. Identify a set of state variables and draw the signal flow graph. From the signal flow graph, mention the state variable equations.	8	K3	CO1
		ii. Determine the transfer function from the signal flow graph.	6		
		(OR)			
	b)	Draw the signal flow graph and compute the closed-loop transfer function of a system whose block diagram is given in the below-mentioned figure.	13	K3	CO1



12.	a)	The open-loop transfer function of a unity feedback system is mentioned below.			

$$G(s)=\frac{K}{s(s+2)}$$

The system is required to meet the following specifications.
Peak time = t_p = 1.0 second, Peak overshoot = M_p = 10%.

		i. What is the value of 'K' so that 't_p' and 'M_p'are violated by the same percentage?	6		
		ii. Assume the open-loop pole (p) can be adjusted. Determine the values of 'K' and 'p' to meet both specifications. Mention a suitable method for adjusting the pole 'p'.	7	K4	CO2

(OR)

b) An unity feedback control system has an open-loop transfer function mentioned below.

$$G(s)=\frac{2(s+8)}{s(s+2)}$$

i. Compute the c(t) for the unit step and unit ramp input. 7

ii. Replace zero by '-10' and increase the gain to 16. Find the percentage change in damping factor and natural frequency. 6 K4 CO2

13. a) Sketch the direct and inverse polar plots for a unity feedback system with an open-loop transfer function mentioned below. 13 K3 CO3

$G(s)=\frac{1}{s(s+1)^2}$ Also, find the frequency at which $|G(j\omega)|=1$ and the corresponding phase angle, $\angle G(j\omega)=1$.

(OR)

b) The closed-loop transfer function of a feedback system is given below.

$$T(s)=\frac{1000}{(s+22.5)(s^2+2.45s+44.4)}$$

i. Determine the resonance peak M_r and resonant frequency ω_r of the system by drawing the frequency response curve. Determine the BW of the equivalent second-order system. 7 K3 CO3

ii. What should be the values of the damping ratio and undamped natural frequency of the equivalent second-order system which will produce the resonant peak and frequency determined by part-i? 6

14. a) Sketch the Bode plot of a closed-loop system that has the open-loop transfer function given below. 13 K3 CO4

$$G(s)H(s)=\frac{2e^{-sT}}{s(1+s)(1+0.5s)}.$$

Determine the maximum value of T for the system to be stable.

(OR)

b) Sketch the inverse Nyquist plot of a feedback system characterized by the open-loop transfer function 13 K4 CO4

$$G(s)=\frac{K}{s(1+0.1s)(1+s)}$$

Find the value M_r for K=1. By what factor should the gain K be changed so that M_r is 1.4? Determine the new 'ω_r' for the new gain.

15. a) For the system represented by the state equation 13 K3 CO5

$$\dot{\mathbf{x}}(t) = A\mathbf{x}(t)$$

$$\mathbf{x}(t) = \begin{bmatrix} e^{-2t} \\ -2e^{-2t} \end{bmatrix}, when\ \mathbf{x}(0) = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$$

and

$$\mathbf{x}(t) = \begin{bmatrix} e^{-t} \\ -e^{-t} \end{bmatrix}, when\ \mathbf{x}(0) = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

Determine the system matrix 'A' and the state transition matrix.

(OR)

b) For the state equation mentioned below 13 K3 CO5

$$\dot{\mathbf{x}}(t) = A\mathbf{x}(t)$$

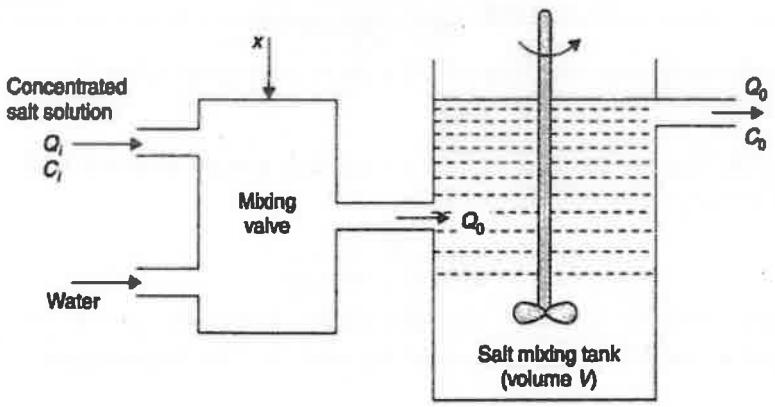
$$A = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$$

Find the initial condition vector x(0), which will excite only the mode corresponding to the eigenvalue with the most negative real part.

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	The below-mentioned system produces a steady stream flow of dilute salt solution having concentration C_0. A concentration solution of salt with concentration C_i is continuously mixed with pure water by a mixing valve. The valve characteristic is such that the total flow rate Q_0 through it is maintained constant. Still, the inflow Q_i of the concentrated salt solution may be linearly varied by controlling valve stem position x. The output flow rate into it from the mixing valve, such that the level of dilute salt solution in the tank is maintained constant. Find the transfer function $C_0(s)/E_0(s)$. If from the fully closed position, the valve stem is suddenly opened by x_0, determine the out stream salt concentration C_0 as a function of a time.	15	K4	CO1



(OR)

b) Solve:

i. The open-loop frequency response of a unity feedback system is mentioned below: 8 K4 CO4

ω	0.8	1.0	1.2	1.4	1.6
$\mathrm{Re}[KG(j\omega)]$	−3.5	−2.9	−2.3	−2.0	−1.2
$\mathrm{Im}[KG(j\omega)]$	−4.4	−3.2	−1.9	−1.2	−0.5

Determine the change in gain 'K' required to make the resonant peak Mr =1.4. For this value of gain, determine the phase margin of the system. Evaluate the value of the damping ratio using the 'Mr-criteria' and phase margin criteria.

ii. The linear continuous-time plant of a sampled-data system is described by the state equation mentioned below. 7 K2 CO5

$$\dot{\mathbf{x}}(t)=\begin{bmatrix}0 & 1\\ -4 & 0\end{bmatrix}\mathbf{x}(t)+\begin{bmatrix}0\\ 1\end{bmatrix}u;\quad \mathbf{x}(0)+\begin{bmatrix}1\\ 0\end{bmatrix}$$

The state equation will be solved for x(t) using a digital computer. Obtain suitable recursive relations. Take sampling interval T=1sec.

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Question Paper Code: 7022

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023

Fifth Semester

Electronics and Communication Engineering

U19EC520 - TRANSMISSION LINES AND WAVEGUIDES

(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	What is characteristic impedance?	2	K1	CO1
2.	A transmission line with a characteristics impedance of 50Ω is connected to a 100Ω resistive load. Calculate the voltage reflection coefficient at the load.	2	K2	CO1
3.	Write the expression for standing wave ratio in terms of reflection co-efficient.	2	K2	CO2
4.	Find the expression for the input impedance of an open circuited line.	2	K3	CO2
5.	Differentiate TE and TM waves in parallel plane wave guide.	2	K3	CO3
6.	Define dominant mode and state the dominant mode of a rectangular wave guide?	2	K3	CO3
7.	Define propagation constant in a circular waveguide.	2	K2	CO4
8.	How a cavity resonator is formed?	2	K3	CO4
9.	Give the advantages of microstrip lines.	2	K1	CO5
10.	Compare coplanner waveguide structure and conventional waveguide structure.	2	K3	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Derive the transmission line equation and hence obtain expression for voltage and current on transmission line	13	K1	CO1
			(OR)			
	b)		Explain about waveform distortion and obtain the condition for distortion less line.	13	K1	CO1
12.	a)	i.	Derive the line constants of a zero dissipation less line.	8		
		ii.	A loss less line has a standing Wave ratio of 4. The R_0 is 150 ohms and the maximum voltage in the line is 135 V. Find the power delivered to the load.	5	K2	CO2
			(OR)			
	b)	i.	Briefly explain on the following: 1. Standing wave. 2. Reflection loss.	6	K3	CO2
		ii.	Discuss in details about the variation of input impedance along open and short circuit line with relevant graphs.	7		
13.	a)		Discuss in detail guided waves between parallel planes with neat diagram.	13	K3	CO3
			(OR)			
	b)	i.	Distinguish between the characteristics of TE and TM waves.	7		
		ii.	Derive the expression for the field components for TM waves between parallel planes.	6	K3	CO3
14.	a)		Explain the propagation of electromagnetic waves in a cylindrical Wave guide with suitable expressions.	13	K3	CO4
			(OR)			
	b)	i.	Derive the solution of field equations using cylindrical co-ordinates.	7	K3	CO4
		ii.	Draw the field configurations of different TM and TE modes for a circular guide.	6		
15.	a)		With neat diagram explain the structure and design procedure of microstrip transmission lines.	13	K3	CO5
			(OR)			
	b)		Write short notes on the following.			
		i.	Coplanner waveguide structure	7	K3	CO5
		ii.	Coplanner strip line and slot line	6		

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16. a)	i.	Discuss the propagation of TM waves in a rectangular waveguide with relevant expressions and diagrams for the field components.	8	K4	CO4
	ii.	A rectangular waveguide measuring a = 4.5 cm and b = 3 cm internally has a 9 GHz signal propagated in it. Calculate the guide wavelength, phase and group velocities and characteristic impedance for the dominant mode.	7		
		(OR)			
b)	i.	Derive the equations to give the relationships among the fields within the rectangular guide.	8	K4	CO4
	ii.	Distinguish between TE and TM modes of the rectangular guide.	7		

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Question Paper Code: 7029

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Electronics and Communication Engineering
U19EC521- ANALOG AND DIGITAL COMMUNICATION
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Mention the advantages of VSB signal. Write its mathematical representation.	2	K1	CO1
2.	Enumerate the limitations and potential applications of AM	2	K2	CO1
3.	Noise is also termed as "Unwanted EM energy". Justify.	2	K3	CO2
4.	Write the relation between noise figure and noise temperature.	2	K1	CO2
5.	A 1 kHz signal of voice channel is sampled at 3 kHz using 12 bit PCM system. If 20 cycles of voice signal are digitized, calculate the required bandwidth.	2	K3	CO3
6.	Define and write the significance of Aliasing.	2	K2	CO3
7.	Define Noise margin in an eye pattern. Identify the noise margin for an acceptable eye pattern.	2	K2	CO4
8.	For the bit sequence 1101011101, draw the waveforms for RZ unipolar, NRZ polar, AMI, Manchester coding techniques.	2	K3	CO4
9.	A BPSK system makes errors at the average rate of 100 errors per day. Data rate is 1 kbps. The single-sided noise power spectral density is 12 W/Hz. Assume the system to be wide sense stationary. Compute the average bit error probability.	2	K3	CO5
10.	Sketch the BER curves for ASK, FSK and BPSK digital modulation schemes.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Explain the working principle of AM transmitter and receiver with suitable diagrams and tabulate their differences.	13	K1	CO1
			(OR)			
	b)	i.	Derive the mathematical representations of AM, FM and PM.	8	K2	CO1
		ii.	Explain the potential application of SSB signals with an example.	5	K1	CO1
12.	a)	i.	State and explain all the types of noises. Derive the SNR expressions for Shot noise and thermal noise.	5	K1	CO2
		ii.	Find the error probability of BFSK system for following parameters. PSD of white noise $No/2=10^{-10}$ Watt/Hz. Amplitude of carrier is, A = 1mV at receiver input. Frequency of baseband NRZ signal is fb =1 kHz.	8	K3	CO2
			(OR)			
	b)		Define and explain noise factor, noise temperature and noise figure. Derive the relationship among them and explain their significance.	13	K1	CO2
13.	a)		A signal having bandwidth of 3.5 kHz is to be encoded using 8 bit PCM and DM system. If 10 cycles of signal are digitized, state how many bits will be digitized in each case if sampling frequency is 11 kHz? Also, find bandwidth required in each case. Derive the equations used.	13	K3	CO3
			(OR)			
	b)		A binary channel with bit rate = 35,000 bits/sec is available for PCM voice transmission. Find number of bits per sample, number of quantization levels and sampling frequency assuming highest frequency component of voice signal is 3.0 kHz.	13	K4	CO3
14.	a)		Analyze in detail about inter symbol interference (ISI) and the Nyquist criterion for minimizing ISI. Elaborate the difficulties in implementing it in a practical system. Derive the supporting equations.	13	K3	CO4
			(OR)			
	b)		Consider a binary sequence with a long sequence of 1's followed by a single '0'and then a long sequence of 1's. Draw the waveform for this sequence using the following signaling formats and explain them: Unipolar NRZ, Bipolar RZ, AMI RZ and Manchester signaling.	13	K3	CO4

15.	a)	Determine the average probability of error and Euclidean distance of BPSK and BFSK and compare the values considering the following parameters: Data rate: 2.3 Mbps PSD of AWGN (No/2): 10^{-15}W/Hz. Received carrier amplitude : 1.1μV.	13	K3	CO5
		(OR)			
	b)	Draw the schematic of non-coherent receiver and explain its concept in detail. Differentiate non-coherent receiver from coherent receiver.	13	K1	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Draw the signal space diagram of a coherent QPSK modulation scheme and also find the probability of error if the carrier takes on one of four equally spaced values at 0, 90, 180 and 270 degrees.	15	K3	CO5
		(OR)			
	b)	In a single integration DM scheme the voice signal is sampled at a rate of 64 kHz, the maximum signal amplitude is 1.5volt, voice signal bandwidth is 4.0 kHz. i. Determine the minimum value of step size to avoid slope overload. ii. Evaluate the granular noise No. iii. Assuming the signal to be sinusoidal, calculate the signal power and SNR.	15	K4	CO3

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Question Paper Code: 7034

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Electronics and Communication Engineering
U19ECE07 – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Who coined the word "Artificial Intelligence"? Who were the pioneering researchers of the field?	2	K1	CO1
2.	Give the general model of learning agent?	2	K1	CO1
3.	What are the limitations in using propositional logic to represent the knowledge base?	2	K2	CO2
4.	A hill climbing procedure has a probability of success=0.25. What is the expected number of runs required for hill climbing with random restarts to be successful?	2	K3	CO2
5.	What is perceptron? When does the perceptron fails to converge?	2	K2	CO3
6.	How Bayesian theorem calculates the posterior probability?	2	K1	CO3
7.	Is K – Nearest Neighbour is a lazy algorithm? Justify you answer.	2	K2	CO4
8.	Justify the necessity for dimensionality reduction in the context of machine learning.	2	K2	CO4
9.	Define Regression. When to use regression?	2	K1	CO5
10.	Distinguish model based and model free learning.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)		Define Artificial Intelligence (AI). Explain the techniques of AI and describe the characteristics of AI	13	K2	CO1
			(OR)			
	b)	i.	Explain why problem formulation must follow goal formulation.	10	K2	CO1
		ii.	What is state space representation in artificial intelligence? What is the purpose of state space representation?	3	K1	CO1
12.	a)	i.	Explain AO* algorithm with a suitable example. State the limitations in the algorithm?	10	K2	CO2
		ii.	What are the phenomenon which cause a hill climbing to get stuck?	3	K2	CO2
			(OR)			
	b)	i.	Explain unification algorithm used for reasoning under predicate logic (first order logic) with an example?	7	K2	CO2
		ii.	Illustrate the use of first order logic to represent knowledge.	6	K1	CO2
13.	a)		Draw the model and explain the algorithm for back propagation. Also, derive the necessary equations to depict the back propagation error.	13	K1	CO3
			(OR)			
	b)	i.	Suppose 10000 patients get tested for flu; out of them, 9000 are actually healthy and 1000 are actually sick. For the sick people, a test was positive for 620 and negative for 380. For the healthy people, the same test was positive for 180 and negative for 8820. Construct a confusion matrix for the data and compute the precision and recall for the data.	7	K4	CO3
		ii.	Differentiate between bagging, boosting and voting.	6	K1	CO3
14.	a)	i.	Use K Means clustering to cluster the following data into two groups. Assume cluster centroid are m1 = 2 and m2 = 4. The distance function used is Euclidean distance. { 2, 4, 10, 12, 3, 20, 30, 11, 25 }	6	K3	CO4
		ii.	Explain the procedure for the computation of the principal components of the data.	7	K6	CO4
			(OR)			
	b)	i.	Explain the concepts of clustering approaches. How it differ from classification.	7	K2	CO4
		ii.	Explain about EM algorithm.	6	K2	CO4

15.	a)	i.	Write short notes on Bias and variance.	4	K1	CO5
		ii.	Discuss about linear regression and derive the individual error & minimization functions.	9	K6	CO5
			(OR)			
	b)		Illustrate the machine learning applications on network for routing and cognitive radio network.	13	K4	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)		Translate into predicate logic and clause form of the following	15	K3	CO2
		i.	John like all kinds of food			
		ii.	Apples are food			
		iii.	Chicken is food			
		iv.	Anything anyone eats and isn't killed is food			
		v.	Bill eats peanuts and still alive			
			(OR)			
	b)	i.	Consider a boy who has a volleyball tournament on the next day, but today he feels sick. It is unusual that there is only a 40% chance he would fall sick since he is a healthy boy. Now, find the probability of the boy participating in the tournament. The boy is very much interested in volley ball, so there is a 90% probability that he would participate in tournaments and 20% that he will fall sick given that he participates in the tournament.	8	K4	CO3
		ii.	Analyze the XOR is not linearly separable? Justify how it can be solved.	7	K4	CO5

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7033

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Electronics and Communication Engineering
U19ECE06 – EMBEDDED SYSTEM DESIGN AND REAL TIME APPLICATIONS
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Classify the processors in embedded system.	2	K1	CO1
2.	Draw the simple view of organization of processor and memory in a system.	2	K2	CO1
3.	What is UART?	2	K1	CO2
4.	Mention the application of watchdog timer.	2	K2	CO2
5.	What are capture registers?	2	K1	CO3
6.	Draw basic timer block diagram.	2	K2	CO3
7.	What are host and target machines?	2	K1	CO4
8.	What is cross assembler?	2	K1	CO4
9.	Define Message Queue.	2	K1	CO5
10.	Outline about Semaphore.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	With neat diagram differentiate between static RAM and dynamic RAM.	13	K2	CO1

(OR)

	b)	What are the programming languages and tools for embedded design? Explain with examples.	13	K2	CO1
12.	a)	What is GPIO control? What are the advanced features of GPIO in Tiva Launchpad? Explain.	13	K3	CO2
		(OR)			
	b)	With neat diagram explain system clocks and control with diagrams & examples.	13	K2	CO2
13.	a)	What is PWM? Explain PWM module and PWM generator with neat sketch.	13	K3	CO3
		(OR)			
	b)	What is QEI? With neat sketch, explain the functional description of QEI.	13	K3	CO3
14.	a)	What are the main goals of software development for embedded systems? Explain how a host system meets these goals.	13	K2	CO4
		(OR)			
	b)	Demonstrate the role of linkers / locators for embedded systems.	13	K2	CO4
15.	a)	Define task scheduling. Discuss in detail about the task states and scheduling.	13	K2	CO5
		(OR)			
	b)	Explain in detail about the semaphores with examples and write its specifications.	13	K3	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)	i.	What is the difference between Hard and Soft real time systems? Give an example for Hard and Soft real time kernels. Explain.	9	K3	CO5
		ii.	Explain the function and use of the following test equipments for embedded system development, 1. Oscilloscope 2. Ohm-meters	6	K4	CO4
			(OR)			
	b)	i.	Write two applications of ARM processor-based systems, with functional block diagram for each application and explain its working.	10	K3	CO2
		ii.	Design Elevator controller system and explain in detail about the working model.	5	K4	CO5

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 6023

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Fifth Semester
Electronics and Communication Engineering
U19ITOE3 – BASICS OF CLOUD COMPUTING
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	How does energy efficiency in cloud computing contribute to reducing carbon footprint?	2	K2	CO 1
2.	Tabulate the difference between distributed computing and cloud computing.	2	K2	CO 1
3.	Given a scenario where a company requires to consolidate their servers. Identify the appropriate virtualization structure for the scenario with proper justification.	2	K2	CO 2
4.	State the difference between physical and virtual networks in a data-center environment.	2	K2	CO 2
5.	"Regularly monitoring and auditing access logs to detect and respond to suspicious activities is essential in trust management." Comment on the statement.	2	K2	CO 3
6.	State the significance of Inter-cloud resource management.	2	K1	CO 3
7.	Show the Amazon AWS operating model.	2	K1	CO 4
8.	How does Google App Engine handle data storage and management?	2	K1	CO 4
9.	Enlist the key benefits of using cloud platforms for IoT applications.	2	K2	CO 5
10.	State the current trends in cloud computing that are supporting the development and deployment of ubiquitous computing applications, and its impact in industry.	2	K2	CO 5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Analyze the design and architecture of scalable computing systems in the cloud, and assess the key factors that contribute to their efficiency and effectiveness. Also assess the challenges and opportunities.	13	K4	CO 1
		(OR)			
	b)	Compare and contrast the different approaches to network-based computing, such as client-server, peer-to-peer, and cloud computing, and assess their relative strengths and weaknesses.	13	K2	CO 1
12.	a)	Examine and contrast the differences between a virtual and physical cluster. Provide a step-by-step explanation to build up a cluster utilizing any virtualization tools or platforms.	13	K3	CO 2
		(OR)			
	b)	Design a virtualization-based automation solution that can dynamically allocate and optimize resources for different types of workloads in a multi-tenant data-center environment.	13	K3	CO 2
13.	a)	Analyze the modular architecture of Microsoft Azure and evaluate its effectiveness in facilitating the development and deployment of scalable applications. List the various components and their roles in enabling scalable application.	13	K4	CO 3
		(OR)			
	b)	Assess the role of cloud computing service models in driving innovation and business growth, and evaluate their impact on the overall digital transformation of organizations in different industries. Provide a case study to support your analysis.	13	K4	CO 3
14.	a)	Elaborate the role of Manjrasoft Aneka in facilitating research and development in the field of distributed and parallel computing. State the potential risks and challenges associated in deployment.	13	K3	CO 4
		(OR)			
	b)	Discuss the Eucalyptus framework-based private cloud setup for an organisation as "Everything as a Service" with a neat sketch.	13	K3	CO 4
15.	a)	Analyze the role of IoT in the context of cloud computing for the development of smart cities, and evaluate its impact on urban planning, management, and sustainability. Provide a case study to illustrate your analysis.	13	K4	CO 5
		(OR)			

	b)	Analyze the impact of online social and professional networking on personal branding and career development, and evaluate the different strategies and best practices that can be used to optimize these outcomes. Provide a real-world case study to support your analysis.	13	K4	CO 5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Create a plan for implementing virtualization for data-center automation in a hypothetical organization, including the selection of appropriate virtualization tools, mechanisms, and security measures. Justify your plan by discussing the potential benefits and challenges associated with virtualization, and provide recommendations for ensuring a successful implementation.	15	K6	CO 2
		(OR)			
	b)	Analyze and evaluate the impact of cloud computing on e-commerce and evaluate the role of different cloud computing platforms, including Nimbus, OpenNebula, Sector, Sphere, and OpenStack, in supporting e-commerce applications. Provide a case study of a company that has adopted a cloud computing platform for e-commerce, and assess the potential benefits and challenges associated with using cloud computing for e-commerce.	15	K5	CO 4

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7024

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Electronics and Communication Engineering
U19EC302 – ELECTRON DEVICES
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

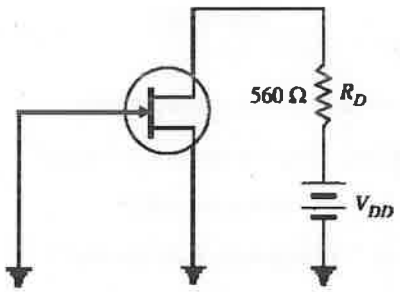
Q.No.	Questions	Marks	KL	CO
1.	What is Fermi level?	2	K1	CO1
2.	Define breakdown voltage in a junction Diode.	2	K1	CO1
3.	Why transistor is called current controlled device?	2	K2	CO2
4.	What do you mean by early effect in a BJT?	2	K2	CO2
5.	Why FET is called as "voltage operated device"?	2	K1	CO3
6.	What do you understand by pinch off voltage?	2	K1	CO3
7.	What are the advantages of PIN photodiode?	2	K1	CO4
8.	What are the advantages of concentrating type solar collector over Non-concentrating type solar collector?	2	K2	CO4
9.	Mention two applications of DIAC and SCR.	2	K3	CO5
10.	Draw the symbols of UJT, TRIAC, DIAC, and SCR.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Describe the working principle of a Zener Diode. What are the advantages of Zener diode over pn junction diode? How it works as voltage regulator? Explain.	13	K1 K2	CO1

(OR)

	b)	Write the working principle of Schottky diode. Explain the V-I Characteristics and mention two applications of Schottky diode.	13	K1 K2	CO1
12.	a)	Draw the h-parameter model for the CE configuration of BJT. Derive all the necessary equation. Write the definitions of all the h-parameters.	13	K1 K2	CO2
		(OR)			
	b)	A NPN transistor is connected in common-emitter configuration in which collector supply is 8V and the voltage drop across the load resistance of 800 ohm connected in the collector circuit is 0.8V. If the current amplification factor is 25, determine collector-emitter voltage and base current. If the internal resistance of the transistor is 200ohm, calculate the voltage gain and power gain.	13	K3 K5	CO2
13.	a)	Describe the Construction, operation and device characteristics of JFET with neat diagram.	13	K1	CO3
		(OR)			
	b)	i. For the JFET in Fig. 1 V_{GS} (off) = – 4V and I_{DSS} = 12 mA. Determine the minimum value of V_{DD} required to put the device in the constant-current region of operation.	5	K3 K4	CO3
		 Fig. 1	8	K1	CO3
		ii. What is MESFET? Write its working principle.			
14.	a)	Write and explain the types of Charge-Coupled Devices with their working principles.	13	K1 K2	CO4
		(OR)			
	b)	i. Write the difference between APD and PIN photodiode?	6	K1	CO4
		ii. Write the working principle of LASER diode. What are the applications of LASER diode?	7	K2	
15.	a)	Write and describe the basic structure and characteristics of GTO. Write the applications of GTO.	13	K1	CO5
		(OR)			

	b)	A half-wave rectifier circuit employing an SCR is adjusted to have a gate current of 1mA. The forward breakdown voltage of SCR is 100 V for Ig = 1mA. If a sinusoidal voltage of 200 V peak is applied, find : 1. firing angle 2. conduction angle 3. average current. Assume load resistance is 100Ω and the holding current to be zero.	13	K6	C05

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Explain the working principle of a p-channel MOSFET with a diagram. Show the energy band diagram for all three conditions.	15	K4 K6	CO3
		(OR)			
	b)	Describe the working of a PN junction diode in Zero Applied Bias, Forward Applied Bias, and Reverse Applied Bias with suitable diagrams.	15	K1 K2	CO1

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7027

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Electronics and Communication Engineering
U19EC303 – ELECTRONIC CIRCUITS - I
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Why the operating point is selected at the centre of the active region?	2	K1	CO1
2.	What is DC load line?	2	K1	CO1
3.	Define Common Mode Rejection Ratio.	2	K1	CO2
4.	Draw the Darlington emitter follower circuit.	2	K3	CO2
5.	What is meant by over drive factor?	2	K2	CO3
6.	Define cascade current mirror circuit.	2	K1	CO3
7.	Define Miller Effect.	2	K1	CO4
8.	What do you mean by Gain Unity Bandwidth?	2	K2	CO4
9.	What is the significance of Heatsink in power amplifier?	2	K1	CO5
10.	Define conduction angle in power amplifier.	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.			Questions	Marks	KL	CO
11.	a)	i.	What are the major differences between a bipolar and a unipolar device? Explain.	5	K2	CO1
		ii.	Given the information provided in Fig. 1, determine: R_C, R_E, R_B, V_{CE}, V_B (β=80)	8	K3 K4	

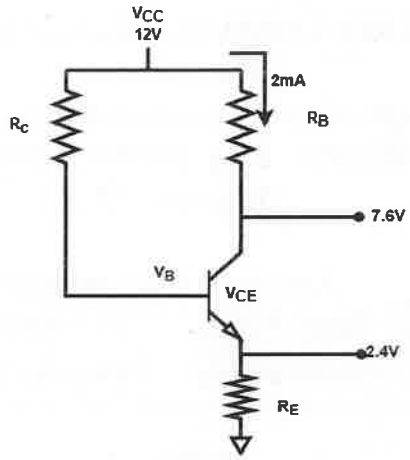

Fig. 1

(OR)

b)	i.	Determine the following for the fixed-bias configuration of Fig.2 (β =50) 1) I_{BQ} and I_{CQ} 2) V_{CEQ} 3) V_B and V_C 4) V_{BC}	8	K4 K5	

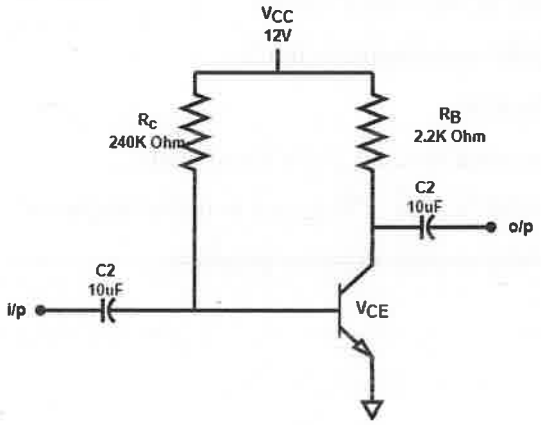

Fig. 2

CO1

	ii.	Define I_{CBO} and I_{CEO}. How are they different? How are they related?	5	K1 K2	

12.	a)	i.	For a common-base configuration with $I_E = 4$ mA, $\alpha = 0.98$, and an ac signal of 2mV applied between the base and emitter terminals: 1. Determine the input impedance. 2. Calculate the voltage gain if a load of 0.56 kΩ is connected to the output terminals. 3. Find the output impedance and current gain.	7	K4	CO2
		ii.	What are the advantages of common emitter configuration and what are the applications of this configuration?	6	K2 K3	
			(OR)			
	b)		Write the differences among CB, CC, CE amplifiers. Give application of each amplifier.	7+6	K1 K2	CO2
13.	a)		What are Common source amplifier and Source follower amplifier? Explain their working principles with circuit diagrams and write applications.	13	K1	CO3
			(OR)			
	b)		Design the cascade amplifier shown at the figure. 3 to obtain g_{m1}=1mA/V and R_o=400kΩ. Use a 0.18μm technology for which V_{tn}=0.5 V, V_A'=5V/μm and k'$_n$=400 μA/V^2. Determine L, W/L, VG2, and I. Use identical transistors operated at Vov=0.2V, and design for the maximum possible negative signal swing at the output (when Vds= Vov). What is the value of the minimum permitted output voltage?	13	K3 K5	CO3

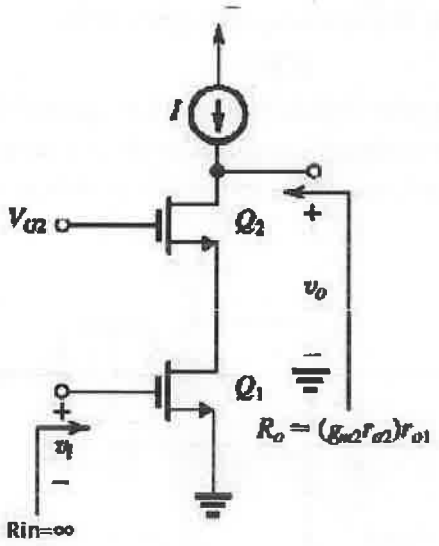

Fig. 3

14. a) Determine the lower cutoff frequency for the network of Fig. 4 using the following parameters: $C_S = 10\ \mu F$, $C_E = 20\ \mu F$, $C_C = 1\ \mu F$ $Rs = 1\ k\Omega$, $R_1 = 40\ k\Omega$, $R_2 = 10\ k\Omega$, $R_E = 2\ k\Omega$, $R_C = 4\ k\Omega$, $R_L = 2.2\ k\Omega$, $\beta = 100$, $r_o = \infty$, $V_{CC} = 20\ V$. — 13 — K3 K5 — CO4

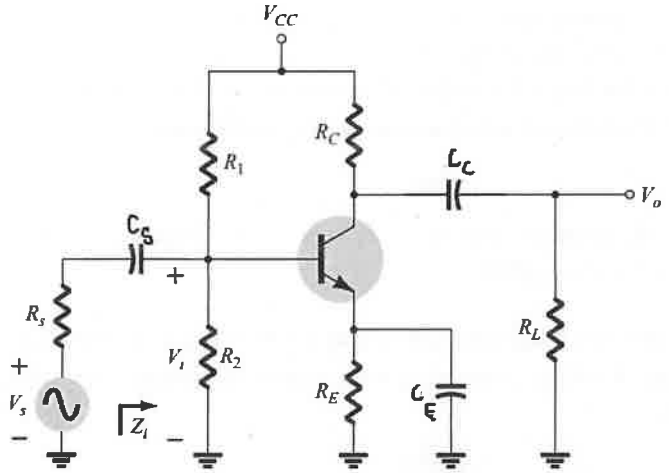

Fig. 4

(OR)

b) What is the difference between low frequency response and high frequency response of MOSFET? What do you mean by short circuit current gain? — 13 — K1 — CO4

15. a) Write the DC bias and AC operation of Series Fed class A amplifier. Write its advantages and applications. — 13 — K1 K2 — CO5

(OR)

b) Calculate the ac power delivered to the 8-Ω speaker for the circuit of Fig.5 The circuit component values result in a dc base current of 6 mA, and the input signal (Vi) results in a peak base current swing of 4 mA. — 13 — K4 — CO5

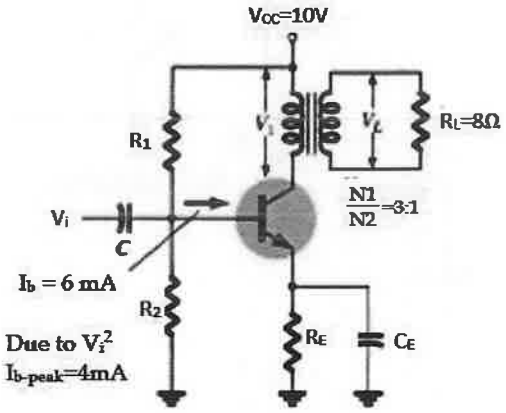

Fig.5

PART – C

(1 x 15 = 15 Marks)

Q.No.			Questions	Marks	KL	CO
16.	a)		Describe the operation of a MOSFET in all the three regions with suitable energy band diagrams.	15	K2 K6	CO1
			(OR)			
	b)	i.	Why biasing is needed for BJT operation? Explain.	5	K2	CO1
		ii.	Design various biasing methods using BJT and explain.	10	K6	

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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7032

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Electronics and Communication Engineering / Biomedical Engineering
U19EC304 / U19EC315 - DIGITAL SYSTEM DESIGN
(Regulation 2019)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Implement using NAND gates only, F = xyz + x'y.	2	K2	CO1
2.	Apply De morgan's theorem to [P(Q+R)]'	2	K1	CO1
3.	Give the logic expression for sum and carry in full adder circuit.	2	K2	CO2
4.	What is priority Encoder?	2	K1	CO2
5.	State the differences between Moore and mealy state machine.	2	K1	CO3
6.	How do you eliminate the race around condition in a JK flip-flop?	2	K2	CO3
7.	What is Hazards in Digital circuits?	2	K2	CO4
8.	Distinguish between a flowchart and an ASM chart.	2	K1	CO4
9.	Compare Dynamic RAM with Static RAM.	2	K1	CO5
10.	Implement a 2-bit multiplier using ROM.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Express the Boolean function as $D= (A'+B)(B'+C)$ as SOP form and POS form.	13	K2	CO1
		(OR)			
	b)	Simplify the following Boolean function by using a Quine-McCluskey method. $F(A, B, C, D) = \Sigma m\ (0, 2, 3, 6, 7, 8, 10, 12, 13)$	13	K2	CO1
12.	a)	Construct a 16 bit parallel adder with 4 MSI circuit, each containing a 4 bit parallel adder. Use a block diagram with nine inputs and five outputs for each 4 bit adder. Show how the carries are connected in MSI circuit	13	K3	CO2
		(OR)			
	b)	Draw the logic diagram of a 2-bit by 2-bit binary multiplier and explain its operation.	13	K3	CO2
13.	a)	Construct a clocked JK flip-flop which is triggered at the positive edge of the clock pulse from a clocked SR flip-flop consisting of NOR gates.	13	K3	CO3
		(OR)			
	b)	Explain the operation of a BCD ripple counter with JK flip-flops.	13	K3	CO3
14.	a)	Design a full adder using two half adders by writing Verilog program.	13	K2	CO4
		(OR)			
	b)	What are called as Essential Hazards? How does the hazard occur in sequential circuits? How can the same be eliminated using SR latches? Give an example.	13	K2	CO4
15.	a)	Design a combinational circuit using a ROM. The circuit accepts a 3-bit number and generates an output binary number equal to the square of the input number.	13	K2	CO5
		(OR)			
	b)	Explain the principle of operation of EPROM and EEPROM technology.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	A Mealy circuit has an input x and two outputs z1 and z2. The output z1 becomes 1 when 1011 sequence is found on x, and the z2 output becomes 1 when a 111 sequence is found on x. Draw the state diagram using minimum number of states. Also design the circuit.	15	K4	CO3
		(OR)			
	b)	Design an FSM that outputs a "1" if the aggregate serial binary input is divisible by 5. A sample input and output sequence is shown below	15	K4	CO3

Input	Sequence	Value	Output
1	1	1	0
0	10	2	0
1	101	5	1
0	1010	10	1
1	10101	21	0

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VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
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Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 7035

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – JUNE 2023
Third Semester
Electronics and Communication Engineering
U19EC305 – SIGNALS AND SYSTEMS
(Regulation 2019)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

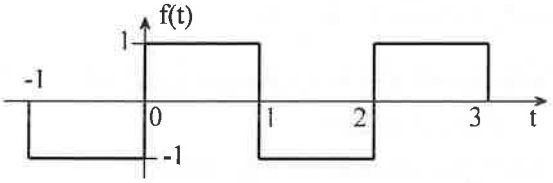
Q.No.	Questions	Marks	KL	CO
1.	What is the fundamental period of x(t) = Cos(πt)+Sin(0.5πt)?	2	K3	CO1
2.	What is random signal? Explain with example.	2	K1	CO1
3.	State time shifting property of Fourier transform.	2	K1	CO2
4.	Why we perform Fourier analysis of signal?	2	K2	CO2
5.	What is impulse response of system?	2	K1	CO3
6.	Solve the differential equation $x' + 2x = e^{-3t}$, x(0) = 0 using Laplace transform method.	2	K3	CO3
7.	What is the scaling property of Z transform?	2	K1	CO4
8.	What is ROC with respect to Z transform?	2	K2	CO4
9.	State time reversal property of discrete time Fourier series.	2	K1	CO5
10.	What do you understand by state variable?	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	What do you understand by LTI system? Prove the convolution property of LTI system.	13	K4	CO1

(OR)

	b)	Determine whether the system $y(t) = tx(t)$ is i. linear ii. dynamic iii. causal	13	K3	CO1
12.	a)	Find the Fourier series of signal f(t)shown below:  	13	K2	CO2
		(OR)			
	b)	State and prove the convolution property of Laplace transform.	13	K1	CO2
13.	a)	Solve the differential equation y''+2y'+2y=0 with the initial conditions y(0) = −1 and y'(0)=2 using Laplace transform method. Given, y is a function of time t	13	K2	CO3
		(OR)			
	b)	Derive the condition for causality and stability in terms of impulse response of a continuous time linear time invariant system.	13	K1	CO3
14.	a)	What is the reason of aliasing? What can we do to prevent it? Proof mathematically that your proposed solution will present aliasing.	13	K3	CO4
		(OR)			
	b)	What are the initial and final value theorem of Z transform? Prove them.	13	K1	CO4
15.	a)	The impulse response of a system is given by h(n) = [1 2 1]. Find the response of the system when it is excited by the input x(n) = u(n − 1) − u(n − 4).	13	K2	CO5
		(OR)			
	b)	Using the unilateral Z-transform, solve the difference equation: Y[n]−4y[n−1]+4y[n−2]=x[n]−x[n−1], when y(−1) = y(−2) = 0	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Write a detailed note on "state variable equations and matrix representation of systems". Also, take any electrical system and create the state variable equations.	15	K2	CO5
		(OR)			
	b)	Find the inverse Laplace transform of $F(s) = \frac{2}{s(s^2+2s+2)}$ considering all the possible ROC scenarios.	15	K4	CO3