4E4131

Roll No. _____ Total No of Pages: 4

4E4131

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronics & Communication
4EC2A Random Variables & Stochastic Processes

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/ calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Prove that $2^n - (n+1)$ equations are needed to establish the mutual independence of n – events. [8]

(b) The age of a person when he dies is denoted by t. The probability that $t \le t_0$ is given by the following equation

$$P(t \le t_0) = \int_0^{t_0} A(t)\,dt$$

Where A(t) is a function determined from mortality records. The curve between A(t) and t is given in Fig.1(b) for $0 \le t \le 100$ years and A(t) is given as $A(t) = 3 \times 10^{-9}\, t^2\, (100 - t)^2$; $0 \le t \le 100$years.

Determine the probability that a person will die between the ages of 60 & 70 assuming that he was alive at 60. [8]

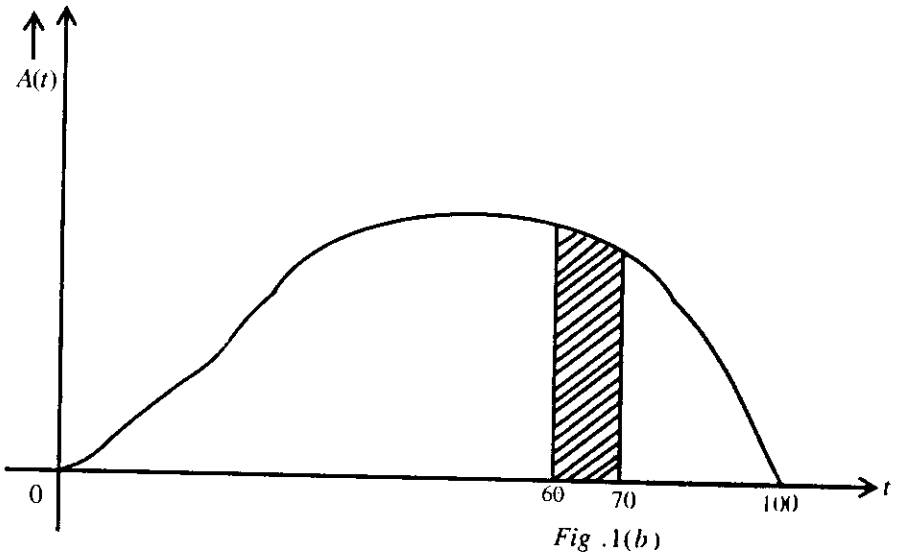

Fig .1(b)

OR

Q.1 (a) In a system, there are n components connected in series. This system works successfully when all units (components) work successfully. The operation of each component is independent to each other. The probability of successful operation of the components is p_i where i = 1, 2, 3,....., n. Find the probability that the system functions satisfactorily. [8]

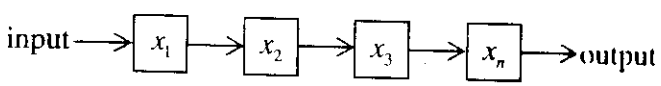

fig.1(a)

(b) State & explain the theorem of total probability & Bayes Theorem. [8]

UNIT-II

Q.2 (a) Explain all the properties of conditional Distribution. [6]

(b) Determine the mean and variance of the random variable X of the following distribution

(i) Uniform distribution [5]

(ii) Exponential distribution [5]

OR

Q.2 (a) Determine the mean and variance of the random variable X of the following distribution

(i) Normal distribution [5]

(ii) Rayleigh distribution [5]

(b) Prove the reproductive property of independent Poisson Random Variable. Hence find the probability of 5 or more telephone calls arriving in a 9min. period in a collage switch board, if the telephone calls that are arrived at the rate of 2 every 3min. Follow a Poisson distribution. [6]

UNIT-III

Q.3 (a) Consider $Z = X + Y$, show that if X and Y are independent Poisson's RV's with parameters λ_1 and λ_2, respectively, then Z is also a Poisson Random Variable. [8]

(b) Let X and Y be the independent random variables with common parameters λ. Define $U = X + Y$, $V = X - Y$. Find the joint and marginal pdf of U and V. [8]

OR

Q.3 (a) A voltage V is a function of time t and is given by

$V(t) = X \cos wt + Y \sin wt$

In which w is a constant angular frequency and $X = Y = N(0, \sigma^2)$ and they are independent. [10]

(i) Show that V(t) may be written as

$V(t) = R \cos(wt - \theta)$

(ii) Find the pdfs of RV's R and θ and show that R and θ are independent.

(b) Define a two dimensional random variable. Give an example of the out – come of a random experiment, that is a two dimensional random variables. [6]

UNIT-IV

Q.4 (a) Consider a continuous random variable X, prove that

$$E[X] = \int_0^{\infty} [1 - F_X(x)]dx - \int_{-\infty}^{0} F_X(x)dx$$

Where $F_X(x)$ is the cdf of X. [6]

(b) Explain the followings;

(i) Liapounoff's form of CLT. [5]

(ii) Lindberg – Levy's form of CLT. [5]

Where CLT = Central Limit Theorem.

OR

Q.4 (a) Consider the random variable X whose characteristics function is given by

$$\varphi_X(w) = \begin{cases} 1-|w| & ; |w| < 1 \\ 0 & ; |w| > 1 \end{cases}$$

Determine the pdf of X. [8]

(b) The Moment generating function of a random variable X is given by

$$M_X(\Omega) = \frac{5}{5-\Omega}$$

Determine the standard deviation of X. [4]

(c) Write down all the properties of characteristics function $\phi_x(w)$. [4]

UNIT-V

Q.5 (a) Write and explain all the properties of power spectral density. [8]

(b) Let X(t) be the WSS process with the auto correlation function given by

$$R_{XX}(\tau) = \left(\frac{A_O^2}{2}\right)\cos(w_O\tau)$$

Where A_o and w_o are constants. Determine the psd of X(t). [8]

OR

Q.5 (a) In the figure given below, X(t) be a input voltage to a circuit and Y(t) be the output voltage. The process X(t) is a stationary random process with zero mean and auto correlation

$$R_{XX}(\tau) = \bar{e}^{\,\alpha|\tau|}$$

Determine E[Y(t)], $S_{YY}(w)$ and $R_{YY}(\tau)$. [10]

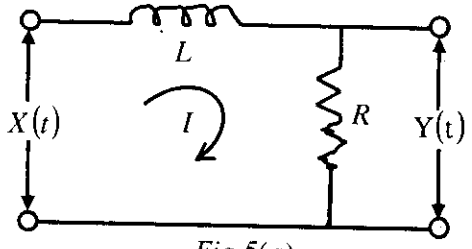

Fig.5(a)

(b) The psd of white noise $\left(\frac{N_O}{2}\right)$ is 6×10^{-6} W/ Hz., is applied to an ideal Low Pass Filter with power transfer function 1 and bandwidth W rad/sec. Find W so that output average noise power is 15 watt. [6]

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4E4132

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronics & Communication
4EC3A Electronic Measurement & Instrumentation

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/ calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Errors in measurements can be classified as – [6+2=8]

(i) Gross errors

(ii) Systematic errors

(iii) Random errors

Explain these errors by giving suitable examples. Discuss the means adopted to minimize these errors.

(b) A 0 – 10 A ammeter has a guaranteed accuracy of 1.5 percent of full scale reading. The current measured by the instrument is 2.5 A. Calculate the limiting values of current and the percentage limiting error. [8]

OR

Q.1 (a) Define the following for Gaussian distribution of data. [2×4=8]

(i) Precision index

(ii) Probable error

(iii) Standard deviation of mean

(iv) Standard deviation of standard deviation

(b) A resistor is measured by Voltmeter - Ammeter methods. The voltmeter reading is 123.4 V on the 250V scale and the ammeter reading is 283.5mA on the 500mA scale. Both meters are guaranteed to be accurate with in ±1 percent of full scale reading. Calculate –

(i) The indicated value of resistance

(ii) The limits within which the result can be guaranteed. [4+4=8]

UNIT-II

Q.2 (a) Describe the functional block diagram of a vector impedance meter. Explain how phase angle measurements are carried out with it. [6+2=8]

(b) The self capacitance of a coil is measured by a Q meter. The circuit is set into resonance by at 2 MHz and the tuning capacitor at 460 PF. The frequency is now adjusted to 4 MHz and resonance conditions are obtained by tuning capacitor at 100 PF. Calculate the value of self capacitance of the coil. [8]

OR

Q.2 (a) Explain the circuit diagram of following types of electronic voltmeters. [4+4=8]

(i) Voltmeters using a series connected diode.

(ii) Voltmeters using a full wave bridge rectifier.

(b) Explain the functioning of an integrating type digital voltmeter. [8]

UNIT-III

Q.3 (a) Derive an expression for vertical deflection of an electron beam in a CRT. [8]

(b) Describe in detail, the construction and working on analog type storage oscilloscope. Explain the principle of secondary emission. [6+2=8]

OR

Q.3 (a) The deflection sensitivity of an oscilloscope is 35 v/cm. If the distance from the deflection plates to the CRT screen is 16 cm, the length of the deflection plates is 2.5 cm, and the distance between the deflection plates is 1.2 cm. What is the acceleration anode voltage? [8]

(b) Describe the following types of oscilloscope:-

(i) Dual trace type

(ii) Dual beam type [4+4=8]

UNIT-IV

Q.4 (a) What is a frequency synthesizer? Describe its circuit in detail. [8]

(b) Describe the working of a harmonic distortion analyzer with a suitable block diagram. [8]

OR

Q.4 (a) Describe the working of a sweep frequency generator. What are the sweeper errors? [6+2=8]

(b) Describe the basic circuit of a spectrum analyzer. Explain how the spectra of the following are displayed: [4+4=8]

(i) Amplitude modulated signals

(ii) Frequency modulated signals

UNIT-V

Q.5 (a) Explain the working and characteristics of following temperature transducers.

(i) RTD

(ii) Thermocouple [4+4=8].

(b) Explain the construction of wire wound strain gauges and derive the expression for the gauge factor. [8]

OR

Q.5 (a) Explain the working of ultrasonic flow meters with a suitable diagram. [8]

(b) Explain the working of piezoelectric transducers and draw its electric equivalent circuit. [8]

4E4133

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4E4133

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronics & Communication
4EC4A Electromagnetic Field Theory

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL 2. NIL

UNIT-I

Q.1 (a) State the gradient, divergence and curl theorems along with their implications. [8]

(b) Check the Stoke's theorem for the function $\vec{F} = x\,y\,\hat{x} + 2yz\,\hat{y} + 3z\,x\,\hat{z}$ using a triangular area whose corners are located at (0, 0, 0), (0, 2, 0) and (0, 0, 2) [8]

OR

Q.1 (a) State the Stoke's and Green's theorems. [8]

(b) Check the divergence theorem for the function $\vec{F} = x\,y\,\hat{x} + 2yz\,\hat{y} + 3z\,x\,\hat{z}$ by considering the volume of a cube with sides of lengths 2 located with its sides on positive axes and one corner over the origin. [8]

UNIT-II

Q.2 (a) Derive the expression for the field intensity due to a circular sheet charge and then extend it to find the field due to an infinite plane sheet charge. [8]

(b) State and explain the Gauss law. Applying the Gauss law, find out the field intensity due to an infinite plane sheet charge. [8]

OR

Q.2 (a) Derive an expression for energy stored in a line charge distribution and extend it to the surface and volume charge distribution. [8]

(b) A parallel plate capacitor of length 'ℓ' with area 'a' is inserted with a dielectric up to a distance ℓ - x. Find the electric force on the dielectric slab. [8]

UNIT-III

Q.3 (a) State and explain the Biot – savart law and derive the expression for magnetic field intensity due to surface and volume currents. [8]

(b) Find the self inductance of a long coaxial cable of length 'ℓ' with inner cylinder radius 'a' and outer cylinder radius 'b' carrying current I. [8]

OR

Q.3 (a) State and explain the Amper's force law for current elements and loops. Does this law obey the Newton's third law? [8]

(b) Find the magnetic field intensity at the centre of a square loop conductor of side L carrying a current of I amps. [8]

UNIT-IV

Q.4 (a) What is the significance of the Maxwell's equations? Mention them in their various forms. [8]

(b) What is the continuity equation? Derive it from the basics and describe all its forms. [8]

OR

Q.4 (a) What is uniform plane waves? Show that the field in the uniform plane wave is independent of two dimensions. [8]

(b) A plane wave with E = 2.0 v/m and a frequency of 300MHz is moving in free space impinging on a thick copper sheet ($\sigma = 5.8 \times 10^7$) located perpendicular to the direction of the propagation. Find the depth of penetration. [8]

UNIT-V

Q.5 (a) Explain the retarded potentials and their concepts of radiation. [8]

(b) Describe the radiation from a small current element and concept of radiation resistance. [8]

OR

Q.5 (a) Describe the methods of eliminating interference. [8]

(b) What are the EMI standards and explain the method of EMI testing. [8]

4E4134

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4E4134

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronics & Communication
4EC5A Optimization Techniques

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*
Units of quantities used/ calculated must be stated clearly.
Use of following supporting material is permitted during examination.
(Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Define the following: [8]

(i) Design vector,

(ii) Objective function,

(iii) Design constraints

(iv) Constraint surface

(b) Define optimization problem. Explain it with physical example. [8]

OR

Q.1 Write a short note on the classification of optimization problems based on various parameters. [16]

UNIT-II

Q.2 (a) Using Simplex method, show that the following linear programming problem has an unbounded solution: [10]

Minimize $f = -3x_1 - 2x_2$

Subject to $x_1 - x_2 \leq 1$

$3x_1 - 2x_2 \leq 6$

and $x_1, x_2 \geq 0$

(b) Write the dual of the following linear programming problem: [6]

Minimize $Z = x_1 + x_2 + x_3$

Subject to $x_1 - 3x_2 + 4x_3 = 5$

$2x_1 - 2x_2 \leq -3$

$2x_2 - x_3 \geq 5$

and $x_1, x_2 \geq 0$, x_3 is unrestricted in sign

OR

Q.2 (a) Use Revised Simplex Method to solve the following linear programming problem: [8]

Minimize $Z = x_1 + 2x_2$

Subject to $2x_1 + 5x_2 \geq 6$

$x_1 + x_2 \geq 2$

and $x_1, x_2 \geq 0$ [8]

(b) Find the optimal solution of the following linear programming problem:

Max $Z = 15x_1 + 45x_2$

Subject to $x_1 + 16x_2 \leq 240$

$5x_1 + 2x_2 \leq 162$

$x_2 \leq 50$

and $x_1, x_2 \geq 0$

Further, if Max $Z = \Sigma C_j x_j$, $j = 1, 2$ and C_2 is kept fixed at 45, determine how much C_1 can be changed without affecting the above solution?

UNIT-III

Q.3 A company has factories at A, B and C which supply warehouses at D, E, F and G. Unit shipping costs (in ₹) are given in the following table. Determine the optimum distribution for this company to minimize shipping costs by Vogel's Approximation Method. [16]

From ↓	To → D	E	F	G	Capacity
A	42	48	38	37	160
B	40	49	52	51	150
C	39	38	40	43	190
Demand	80	90	110	160	500 / 440

OR

Q.3 Four different jobs can be done on four different machines. The setup and take down time cost are assumed to be prohibitively high for change overs. The matrix below gives the costs in rupees of producing job i on machine j: [16]

Jobs	Machine			
	M_1	M_2	M_3	M_4
J_1	5	7	11	6
J_2	8	5	9	6
J_3	4	7	10	7
J_4	10	4	8	3

How should the jobs be assigned to various machines, so that the total cost is minimized?

UNIT-IV

Q.4 (a) Prove that $L_k = (0.618)^{k-1} L_0$, where k is the number of experiments performed and L_k is the length of the interval of uncertainty remaining at the end of k^{th} experiment performed in Golden Section Method. [8]

(b) Define the unimodal function and give an example of it. Also draw the Flowchart for Fibonacci search method. [8]

OR

Q.4 (a) Minimize $f(x_1, x_2) = 2x_1^2 + x_2^2$ by steepest descent Method with the initial point $(1, 2)^T$. (up to three iterations). [8]

(b) Minimize $f(x, y) = x^2 + 2y^2$. Subject to $2x + 5y - 10 \leq 0$, by using Exterior Penalty Method. [8]

UNIT-V

Q.5 Divide a quantity b into n parts so as to maximize their product. Let, $f_n(b)$ denote this product, then show that

$f_1(b) = b$ and $f_n(b) = \max_{0 \leq z \leq b} [z f_{n-1}(b-z)]$.

Hence find the $f_n(b)$ and the division that maximize it and z is one part of b. [16]

OR

Q.5 Solve the following linear programming problem by Dynamic programming Approach: [16]

Max $Z = 2x_1 + 5x_2$

Subject to $2x_1 + x_2 \leq 43$

$2x_2 \leq 46$

and $x_1, x_2 \geq 0$

4E4135

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4E4135

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Applied Electronics & Inst. Engineering
4AI1 Mathematics-IV
Common with AI, BM, EI, CRE, EC, PE, PC

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

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Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Prove the following relations, where symbols have their usual meaning: [8]

(i) $E^{-1} = 1 - \frac{\delta^2}{2} + \delta\sqrt{1 + \frac{\delta^2}{4}}$

(ii) $\Delta = \frac{\delta^2}{2} + \delta\sqrt{1 + \frac{\delta^2}{4}}$

(b) Find interpolation polynomial, which passes through the points (1, -1), (2, -1), (3, 1) and (4, 5). [8]

OR

Q.1 (a) By making use of the following table, find the value of x for which f(x) is maximum or minimum [8]

x	1	2	7	8
f(x)	4	5	5	4

Also find the value of f(x) at x = 6.

(b) Use Sterling formula to find y_{25}, given that

$y_{20} = 24$, $y_{24} = 32$, $y_{28} = 35$, $y_{32} = 40$ [8]

UNIT-II

Q.2 (a) Find the value of $\log_e 2$ from $\int_0^1 \frac{x^2}{1+x^3} dx$, using Simpson's $\frac{1}{3}$ rule, by dividing into four equal parts. [8]

(b) Using Euler's modified method, obtain a solution of $\frac{dy}{dx} = 2 + |\sqrt{xy}|$, y(1) = 1, for the range $1 \leq x \leq 1.6$ in three steps. [8]

OR

Q.2 (a) Below given table shows the values of $l_{n,x}$ for various x. Find approximation to the derivatives of $l_{n,x}$ at x = 2.4 by using the central interpolation formula: [8]

x	2.0	2.2	2.4	2.6	2.8
$l_{n,x}$	0.69315	0.78846	0.87547	0.95551	1.02962

(b) Using Runge – Kutta method, solve the following initial value problem for x = 1.2 & 1.4 [8]

$$\frac{dy}{dx} + \frac{y}{x} = \frac{1}{x^2}, y(1) = 1.$$

UNIT-III

Q.3 (a) State and prove orthogonal property for Legendre polynomial. [8]

(b) Prove that [8]

$$\frac{d}{dx}\left\{\frac{J_{-n}(x)}{J_n(x)}\right\} = -\frac{2\sin n\pi}{\pi x J_n^2}.$$

OR

Q.3 (a) Show that [8]

(i) $xJ'_n(x) = nJ_n(x) - xJ_{n-1}(x)$

(ii) $J_{3/2}(x) = \sqrt{\frac{2}{\pi x}}\left(\frac{\sin x}{x} - \cos x\right)$

(b) Show that [8]

$$(1 - 2xz + z^2)^{-1/2} = \sum_{n=0}^{\infty} z^n P_n(x), \quad |x| \le 1, |z| < 1.$$

UNIT-IV

Q.4 (a) There are three similar coins, one of which is ideal and other two are biased. The chances of head are respectively 1/3 and 2/3. A coin is selected at random and tossed twice. If head occurs both times, then find the probability that the ideal coin was selected. [8]

(b) Derive moment generating function for Binomial distribution. Hence, find mean and variance for the same. [8]

OR

Q.4 (a) Prove that Poisson distribution is a limiting case of Binomial distribution. [8]

(b) Calculate the rank correlation coefficient for the following data: [8]

X:	81	78	73	73	69	68	62	58
Y:	10	12	18	18	18	22	20	24

UNIT-V

Q.5 (a) Find the curve joining the points (x_1, y_1) and (x_2, y_2) that yields a surface of revolution of minimum area when revolved about the axis. [8]

(b) Find a function y(x) for which $\int_0^1 \left[x^2 - (y')^2\right] dx$ is stationary, given that [8]

$$\int_0^1 y^2\, dx = 2,\ y(0) = 0,\ y(1) = 0.$$

OR

Q.5 (a) State and prove Euler's equation. [8]

(b) Find the extremals of the functional [8]

$$v[y(x), z(x)] = \int_0^{\pi/2} \left[(y')^2 + (z')^2 + 2yz\right] dx$$

Where $y(0) = 0$, $y(\pi/2) = -1$, $z(0) = 0$ and $z(\pi/2) = 1$.

4E2090

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4E2090

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Applied Electronics & Inst. Engineering
4AI6.1 Object Oriented Programming
BM, AI, EC, EI

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 Explain the various important paradigm of object oriented programming with a programming example. [16]

OR

Q.1 (a) Explain the use of public, private & protected data members in class. [8]

(b) What is a class? How class and the instance of the class are created? [8]

UNIT-II

Q.2 What is constructor? How many types of constructors are in C++? Describe with the help of a suitable example. [16]

OR

Q.2 (a) What is friend function? Write a program to swap private data of two classes. [8]

(b) What is inheritance? Explain the types of inheritance in detail. [8]

UNIT-III

Q.3 (a) Explain the concept of Byte code in JAVA. [8]

(b) Give reason why JAVA is considered to be fully object oriented programming language. [8]

OR

Q.3 (a) What is applet? Explain life cycle of applet. [8]

(b) Explain different types of variable in JAVA and also JVM. [8]

UNIT-IV

Q.4 (a) Write a JAVA program to check the number even or odd. [8]

(b) Explain the following operators:

(i) Relational operators [4]

(ii) Boolean logic operators [4]

OR

Q.4 (a) Explain operator precedence with suitable example. [8]

(b) Write a program to sort an integer array in descending order. [8]

UNIT-V

Q.5 What is interface? How you will create an interface. Write all steps to create and implement an interface. How it is different with class? [16]

OR

Q.5 (a) What is package and how can we create a package in JAVA? Explain. [8]

(b) Write short notes on:-

(i) Access protection [4]

(ii) Interface [4]

300

4E2149

Roll No. _____ Total No of Pages: 4

4E2149

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Bio Medical Engineering
4BM3 Digital Electronics
BM, EX, EI, EC

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1._____ 2._____

UNIT-I

Q.1 (a) Perform the following operations- [4×3 =12]

(i) $(68)_{10} - (31)_{10}$ using BCD subtraction.

(ii) $(1101101 - 1010111)_2$ using 1's complement method.

(iii) $(22 - 31)_{10}$ using 9's complement method.

(iv) $(1101101)_{Gray} \rightarrow (\quad)_2$.

(b) Write a short note on error correction & detection codes. [4]

OR

Q.1 (a) Simplify the [4×2=8]

(i) $A\overline{B} + ABC + A(B + A\overline{B})$

(ii) $\left[A\,\overline{B}\,(C + B\,D) + \overline{A}\,\overline{B}\right]C$

(b) Find the value of x [2+2 = 4]

(i) $(23)_x + (12)_x = (101)_x$

(ii) $(1000)_x = (11_2)^3$

(c) Implement Boolean function $f = (w + \overline{x})(w + \overline{x} + z)(y + z)$ using NOR gate only.[4]

UNIT-II

Q.2 (a) What do you understand by TTL logic. How open collector TTL is different from normal TTL circuit. [6+4=10]

(b) Write down the comparison between CMOS & TTL families. [6]

OR

Q.2 (a) Draw & explain the working of DTL- NAND gate. [6]

(b) Explain the construction & operation of MOSFET. Implement the NAND & NOR gate using NMOS logic circuit. [4+6=10]

UNIT-III

Q.3 (a) Obtain & realize the minimum SOP expression by using K map for f (A, B, C, D) $= \pi M (0, 2, 5, 7, 8, 10)$ [8]

(b) Write a short note on variable mapping. [4]

(c) Develop the truth table for. [4]

$f = \overline{A}\,B\,\overline{C}\,\overline{D} + \overline{A}\,B\,C\,\overline{D} + A\,\overline{B}\,\overline{C}\,D + \overline{A}\,\overline{B}\,\overline{C}\,\overline{D}$

OR

Q.3 (a) By using Quine- McCluskey method minimize the given output function. [8]

$f = \Sigma_m (0, 1, 4, 7, 8, 10, 12, 13, 14) + \Sigma_d (5, 9)$

(b) $AB\overline{C} + \overline{A}\,B\overline{C} + \overline{A}\,B\,\overline{C} + \overline{A}\,\overline{B}\,\overline{C}$ Convert into POS form. [4]

(c) Convert $f = \overline{A}\,B + \overline{C} + A\,B\,\overline{D}$ into canonical SOP form. [4]

UNIT-IV

Q.4 (a) Draw & explain the logic diagram of binary Adder & substractor. [8]

(b) Write a short note on Diode switching matrix. [8]

OR

Q.4 (a) Design the combinational logic circuit for BCD to EX-3 code converter. [8]

(b) Implement the following: [4×2=8]

(i) Full adder using half adder only

(ii) $f (A, B, C) = \pi M (0, 4, 6, 7)$ using 8:1 M_{ux}

UNIT-V

Q.5 (a) Draw the four bit binary ripple counter diagram using flip –flop that trigger on the positive edge. [8]

(b) Realization of [4×2=8]

(i) RS FF to JK FF

(ii) JK FF to D FF

OR

Q.5 (a) What do you understand by race around condition. How it over come in master slave JK FF. [8]

(b) Write a short note on shift registers. [8]

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4E4124

Roll No. _____ Total No of Pages: 3

4E4124

B.Tech. IV Sem. (Main / Back) Exam; June-July 2016
Bio Medical Engineeing
4BM5 Analog Communication
Common with BM, EI

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Discuss the types, causes and effects of the various forms of noise which may be created within a receiver or an amplifier. [8]

(b) A receiver connected to an antenna whose resistance is 50Ω has an equivalent noise resistance of 30Ω. Calculate the receiver's noise figure in decibels and its equivalent noise temperature. [8]

OR

Q.1 (a) Define signal – to – noise ratio and figure of a receiver. When might the letter be a more suitable piece of information than the equivalent noise resistance? [8]

(b) The first stage of a two – stage amplifier has a voltage gain of 10, a 600Ω input resistor, a 1600Ω equivalent noise resistance and a 27 - KΩ output resistance. For the second stage, these values are 27, 81KΩ, 10KΩ and 1 mega ohm (1mΩ), respectively. Calculate the equivalent input – noise resistance of this two – stage amplifier. [8]

UNIT-II

Q.2 (a) Define amplitude modulation and modulation index. Use a sketch of a sinusoidally modulated AM wave form to help explain the definatian. [8]

(b) Calculate the percentage power saving when the carrier and one of the side bands are suppressed in an AM wave modulated to a depth of

(i) 100 percent and

(ii) 50 percent. [4×2=8]

OR

Q.2 (a) What is pre – emphasis? Why is it used? Sketch a typical pre – emphasis circuit and explain why de – emphasis must be used also. [8]

(b) Find the carrier and modulating frequencies, the modulation index, and the maximum deviation of the FM wave represented by the voltage equation $V = 12 \sin (6 \times 10^8 t + 5 \sin 1250t)$. What power will this FM wave dissipate in a 10 - Ω resistor? [8]

UNIT-III

Q.3 (a) What are the advantages that the superheterodyne receiver has over the TRF receiver? Are there any disadvantages? Also draw the diagrams. [8]

(b) Define the terms sensitivity, selectivity and image frequency. [8]

OR

Q.3 (a) What is simple automatic gain control? What are its functions? [8]

(b) Describe the difference between AM and FM receivers, bearing in mind the different frequency ranges and bandwidths over which they operate. [8]

UNIT-IV

Q.4 (a) Define the characteristic impedance of a transmission line. When is the input impedance of a transmission line equal to its characteristics impedances. [8]

(b) It is required to match 200Ω load to a 300Ω transmission line, to reduce the SWR along the line to 1. What must be the characteristic impedance of the quarter – wave transformer used for this purpose, if it is connected directly to the load? [8]

OR

Q.4 (a) Draw the general equivalent circuit of a transmission line and the simplifier circuit for a radio – frequency line. What permit this simplification? [8]

(b) Explain the measurement of SWR of line. [8]

UNIT-V

Q.5 (a) Explain what is meant by saying that a satellite in "Statuonary" Why are such satellites used for worldwide communications, in performance to any other kind? [8]

(b) Draw the block diagram of satellite communication and explain it. [8]

OR

Q.5 (a) Draw the block diagram of a basic radar set, and explain the essentials of its operation. [8]

(b) Explain the fiber characteristics and classification with mode and refractive index profile. [8]

4E4121

Roll No. _____ Total No of Pages: 2

4E4121

B.Tech. IV Sem. (Main / Back) Exam; June-July 2016
Electronic Inst. & Control Engineering
4EI2A Control System-I

Time: 3 Hours **Maximum Marks: 80**

Min. Passing Marks (Main & Back): 26

Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

1. NIL 2. NIL

UNIT-I

Q.1 (a) Draw the schematic diagram of a closed loop control system of your choice. Draw its block diagram also. [8]

(b) Find the transfer function of the system shown in figure 1 by block diagram reduction technique. [8]

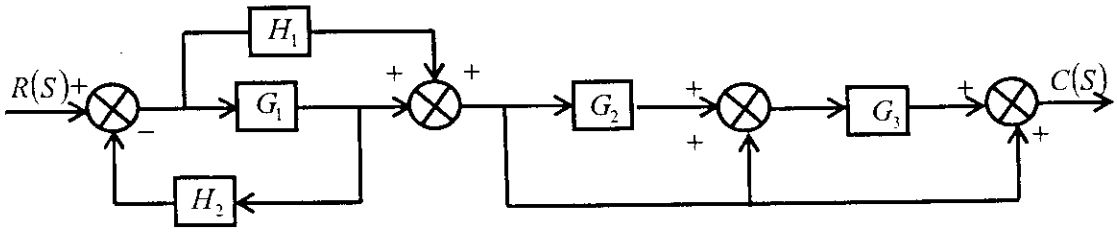

Figure – 1

OR

Q.1 (a) What do you understand by open loop and closed loop control system. Also highlights thir merits and demerits. [8]

(b) Give brief idea of multivariable control system. [3]

(c) Find the transfer function of the system shown in figure 1 by signal flow graph techniques [5]

UNIT-II

Q.2 In general, explain the features of a servo-motor. Then after, develop the block diagram for armature controlled DC servomotor and find its transfer function. [16]

OR

Q.2 Explain the following [4×4=16]

(a) Potentiometer as Error Detector
(b) Stepper motor
(c) Synchros
(d) AC tacho generator

UNIT-III

Q.3 (a) Derive the response of second order under damped system for unit step input. [8]

(b) Define time response specifications and also derive any two. [4×2=8]

OR

Q.3 (a) Define the following [4×2=8]

(i) Transient and steady state response.
(ii) Absolute and relative stability.

(b) Comment upon the stability of the system having characteristic equation as $10s^4 + 9s^3 + 3s^2 + 6s + 9 = 0$ [8]

UNIT-IV

Q.4 Sketch the Nyquist plot of the transfer function $G(s) = \frac{5}{s^2(S+2)}$ and also comment on open loop & closed loop stability. [16]

OR

Q.4 Draw the root locus of the system whose open loop transfer function is given by $G(s)H(s) = \frac{K}{s(s+2)(s+3)}$ Also mark all the salient points on the plot. [16]

UNIT-V

Q.5 (a) Sketch the bode plot for the system, whose open loop transfer function is given by $G(s) = \frac{1000}{(1+0.2s)(1+0.002s)}$ [8]

(b) Define the following terms [4×2=8]

(i) Frequency Domain Specifications
(ii) Gain & Phase margin

OR

Q.5 (a) Compare hag, lead and lag-lead networks in detail Also explain the need of compensation in control system. [8]

(b) Explain industrial controllers in detail also summarize the need of individual (proportional. derivative and integral) controllers. [8]

Total No of Pages: 2

4E4123

Roll No. _____

4E4123

B.Tech. IV Sem. (Main / Back) Exam; June-July 2016
Electronic Inst. & Control Engineering
4EI4A Sensors and Transducers

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

1. NIL

2. NIL

UNIT-I

Q.1 (a) What is the need for statistical analysis of measured values and when does it arise? Suggest a measurement process when the results are subjected to this analysis. [8]

(b) A set of independent current measurements were recovered as 10.03, 10.10, 10.11 and 10.08 A. Calculate (a) the average current, and (b) the range of error. [8]

OR

Q.1 Explain the process of calibration used in measuring instruments. Also describe different standard used. [16]

UNIT-II

Q.2 Explain the basic principles of operation of ionization transducers and show how the phenomenon of ionization enables measurement of certain physical quantities? [16]

OR

Q.2 (a) Describe the constructional features of a magnetostrictive transducer and obtain- and obtain the input – output relationship. [8]

(b) Explain how acceleration and torsion can be measured by applying magneto strictive phenomenon? [8]

UNIT-III

Q.3 (a) Define the gauge factor of a resistance strain – gauge and obtain the expression for the same in term of other constants. [8]

(b) Explain the inductive transducers to measure the thickness. [8]

OR

Q.3 Show how a capacitive transducer can be used to monitor the thickness of an insulating sheet in motion, without making physical contact. comment on the linearity and sensitivity of the system? [16]

UNIT-IV

Q.4 (a) Explain how bimetallic elements enable measurement of temperature and show how they are shaped for use? [8]

(b) Describe the constructional features of a bellows and show how they are useful for pressure measurement? [8]

OR

Q.4 Explain the following: - [8+8=16]

(i) Viscosity to torque converter.

(ii) Air bubbler system.

UNIT-V

Q.5 (a) Explain the theory and working of LCDs. Describe the difference between light scattering and field effect types of LCDs. Also explain the advantages of LCDs. [8]

(b) Explain the theory and working of LED. Describe the advantages of LEDs. [8]

OR

Q.5 Write short notes on: - [8+8=16]

(i) Gas discharged plasma panels.

(ii) Electroluminescent display

4E4125

Roll No. _____ Total No of Pages: 2

4E4125

B.Tech. IV-Sem (Main & Back) Exam; June-July 2016
Electronic Inst. & Control Engg.
4EI6A Electrical Technology

Time: 3 Hours

Maximum Marks: 80
Min. Passing Marks (Main & Back): 26
Min. Passing Marks (Old Back): 24

Instructions to Candidates:-

*Attempt any **five questions**, selecting **one question** from **each unit**. All Questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.*

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No.205)

1. Graph Paper (01 No.) 2. _____

UNIT-I

Q.1 (a) Derive the equation of e.m.f. generated in D.C. generators. [8]

(b) Explain the torque speed characteristics of D.C. shunt motor. [8]

OR

Q.1 (a) Explain the no load and load characteristics of D.C. shunt generator. [8]

(b) Describe the speed control methods of D.C. shunt motor. [8]

UNIT-II

Q.2 (a) Explain the torque – slip curve of Induction motor. [8]

(b) Why Induction motor takes high starting current? What are the starting methods explain. [8]

OR

Q.2 (a) Describe braking methods of Induction motor. [8]

(b) Why single phase induction motors are not self starting. How the single phase induction motor started. [8]

UNIT-III

Q.3 (a) How the synchronous motors started? Explain. [8]

(b) Explain the OCC & SCC of synchronous machine. [8]

OR

Q.3 (a) How the zero power factor characteristics are obtained for synchronous machine. [8]

(b) The O.C. & S.C. Test data of a 3 – phase 1 MVA, 6.6 kv, star connected synchronous generator is given below: [8]

I_f(A)	60	70	80	90	100	110
V_{oc} line (V)	4693	5500	6160	6600	6967	7260
SC (A)	98					

Find the excitation voltage needed to give rated voltage at full load 0.8 P.F. lagging.

UNIT-IV

Q.4 (a) Give general idea of power transmission. What is the relation between system voltage and transmission line current. [8]

(b) Draw a line diagram of a substation showing all the electrical equipment. Explain the equipment used in a substation. [8]

OR

Q.4 (a) Describe the distribution system in a power system. Explain the radial distribution system. [8]

(b) Explain the interface of power lines with telecommunication circuits. [8]

UNIT-V

Q.5 (a) Name of Basic types of faults in power system. Explain line to line fault. [8]

(b) Describe the over current protection schemes. Explain any over current relay. [8]

OR

Q.5 (a) What are the advantages of static relays? Explain the static instantaneous over current relay with block diagram. [8]

(b) Explain the earth fault protective schemes. [8]
