4E2090

Roll No. _____ Total No. of Pages: 2

4E2090

B.Tech. IV Semester (Back) Examination, May- 2018
Applied Electronics & Inst. Engg.
4AI6.1 Object Oriented Programming
BM,AI,EC,EI

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*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.*

UNIT - I

1. a) What is object-oriented concept of programming? Discuss with all features. **(8)**
   b) Explain the advantage and disadvantage of OOPs. **(8)**

OR

1. a) What do you mean by abstraction and encapsulation. **(8)**
   b) How message are passed between objects. Explain with example. **(8)**

UNIT - II

2. a) Discuss Enhancement in C++ over C **(8)**
   b) Explain constructor and destructor with example. **(8)**

OR

2. a) Explain virtual function and inline function with the help of example. **(8)**
   b) Write a program to find maximum of two/value using friend function. **(8)**

UNIT - iii

3. a) Explain the concept of Byte Code in JAVA. Discuss key features of JAVA in brief. **(8)**
   b) Define virtual machine? Also write advantage of virtual machine. **(8)**

OR

3. a) What is applet ? Explain life cycle of applet. **(8)**
   b) Write a Java program to find factorial of a given no using recursion. **(8)**

UNIT - IV

4. a) Discuss operator precedence with suitable example. **(8)**

b) Explain the following operators.

i) Relational operators.

ii) Boolean logic operators. (2×4=8)

OR

4. a) Write a program in Java to find inverse of a matrix. (8)

b) Explain the following operator with suitable example.

i) Bitwise operator

ii) Ternary operator (2×4=8)

UNIT - V

5. a) What is package and how can we create a package in Java. Explain. (8)

b) How interface is different from abstract class. (8)

OR

5. a) What is interface. How you will create a interface? (8)

b) Explain access protection in Java. How to import a package in class. (8)

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4E4124

Roll No. _____ [Total No. of Pages : 3

4E4124

B.Tech. IV Semester (Main/Back) Examination, May-2018
Electronic Inst. & Control Engineering
4EI5A Analog Communication
BM,EI

Time : 3 Hours

Maximum Marks : 80
Min. Passing Marks : 26

*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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Define term Noise figure, Calculate the overall Equivalent noise figure and Temperature of Cascaded amplifier. **(10)**

   b) Find the r.m.s. value of thermal voltage across a resistor of $1M\Omega$ at a temperature of 27^0C, if the measurement is made with an increment having a bandwidth of 10^4 Hz. **(6)**

OR

1. a) Compare the Analog Communication Systems with Digital Communication systems. **(8)**

   b) Define shot noise and Thermal Noise **(8)**

Unit - II

2. a) An AM signal is given by $X_c(t) = [30 + 9Cos\ 200\pi t + 12Cos 3000\pi t] Cos\ 2\pi \times 10^5 t$ Determine the carrier power and total Sideband power. **(8)**

   b) Draw a block diagram of Weaver method of SSB - generation and explain. **(8)**

OR

2. a) Sketch the frequency domain representation of DSB-SC and SSB-SC signals, draw and explain the principle of balance modulator. **(10)**

   b) An FM radio link has a frequency deviation of 30 KHz. The modulating frequency is 3 KHz. Calculate the B.W. needed for the link. What will be the BW if frequency deviation is reduced to 15 KHz. **(6)**

Unit - III

3. a) Draw the block diagram of Superheterodyne receiver and explain the function of each block. **(10)**

   b) Discuss the operation of envelope detector. **(6)**

OR

3. a) Define the terms Pre emphasis and De emphasis with suitable circuits. **(4)**

   b) Briefly explain & compare the methods of FM detection. **(12)**

Unit - IV

4. a) Draw a block diagram of a setup for measurement of attenuation and VSWR of transmission line and explain. **(12)**

   b) Write the characteristics of coaxial cables. **(4)**

OR

4. a) A transmission line of characteristics impedance of 500 Ω is terminated by a reactance of j 100 Ω. Find the input of a section 25cm long at a frequency of 300 MHz. **(8)**

   b) The terminating load of UHF transmission line $\left(Zo = 50\angle o^0 ohms\right)$ Working at 300 MHz is (50+j 50)Ω. Calculate VSWR and reflection coefficient. **(8)**

Unit - V

5. a) Draw the block diagram of Mobile Communication and explain the following

   i) SIM
   ii) Cellular Network
   iii) Handoff
   iv) Mobile Antennas **(12)**

b) An Optical Fiber is made of glass with a refractive index of 1.55 and is clad with another glass with a refractive index of 1.51. What does numerical aperture the fiber have? **(4)**

OR

5. Write the short notes on :

i) Radar Communication

ii) Satellite Communication **(8×2=16)**

4E 4123

Roll No. _____ [Total No. of Pages : 2

4E 4123

B.Tech IV Semester (Main & Back) Examination May 2018

Electronic Inst. & Control Engineering.

4EI4A Sensors and Transducers

Time : 3 Hours

Maximum Marks : 80
Min Passing Marks : 26

*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.*

UNIT - I

1. Explain the first and second order systems by giving an example. Derive an expression for the response of first order system for unit step, ramp and parabolic inputs? **(16)**

(OR)

1. a) Differentiate the static and dynamic characteristics of transducer ? Explain in brief. **(8)**
   b) Explain the various calibration techniques and standards. **(8)**

UNIT - II

2. a) Explain the working, merits and demerits of Magnetostrictive transducers. **(8)**
   b) Draw and explain the characteristics of Hall effect transducers. **(8)**

(OR)

2. a) Explain the construction and working of pirani gauges with suitable diagrams. **(8)**
   b) Explain the pieze electric crystal water used as a force transducer. Mention various modes of utilizing piezo electric effect. **(8)**

UNIT - III

3. a) Draw and explain the characteristics of following transducers:-
   (1) Thermo couples
   (2) LVDT **(8)**

b) What do you mean by gauge factor. Derive an expression of gauge factor of strain gauges. Differentiate the bonded and unbonded strain gauges. (8)

(OR)

3. a) How pressure measurement is carried with the help of bourden tube? Explain. (8)

b) Explain the capacitive transducer for the measurement of thickness of an infulating sheet. (8)

UNIT - IV

4. Explain the following:-

a) U-tube weighing system (8)

b) Seismic accelero meters. (8)

(OR)

4. Write short notes on:-

a) Load cell (8)

b) Hydrometers (8)

UNIT - V

5. a) Explain the working of Gas discharged plasma panels with suitablediagrams. (8)

b) Explain the 5×7 LED matrix used to display alphabet and decimal digit with neat diagram. (8)

(OR)

5. Write short notes on the following:-

a) Electrophoretic displays (8)

b) LCD displays (8)

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4E 4121

Roll No. _____ [Total No. of Pages : 4

4E 4121

B.Tech. IV Semester (Main/Back) Examination May - 2018
Electronic Inst. & Control Engineering
4E12A Control System - I

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

Min. Passing Marks : 26

*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 suitable be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.*

Unit - I

1. a) Determine the $\frac{C(s)}{R(s)}$ for the system whose block diagram is given in figure 1 below.

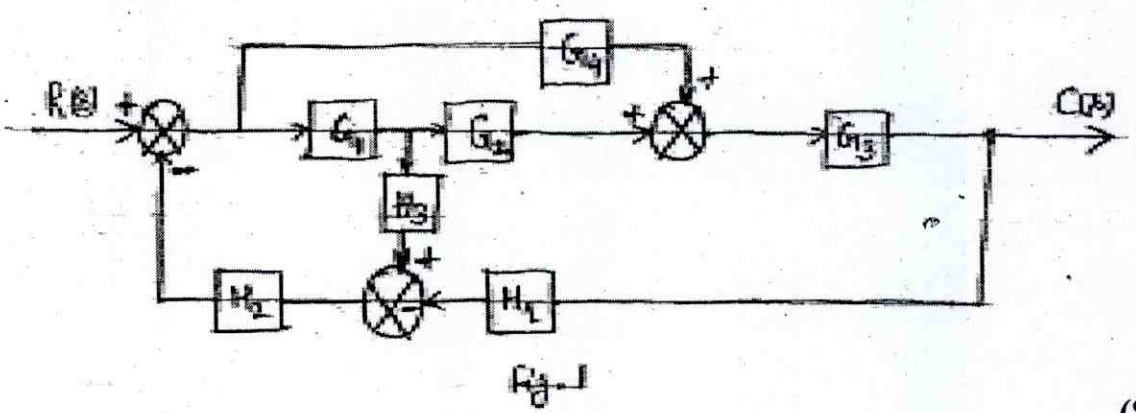

Fig. 1

(8)

b) Obtain the transfer function $\frac{V_0(s)}{V_i(s)}$ for the network shown in the figure 2 below.

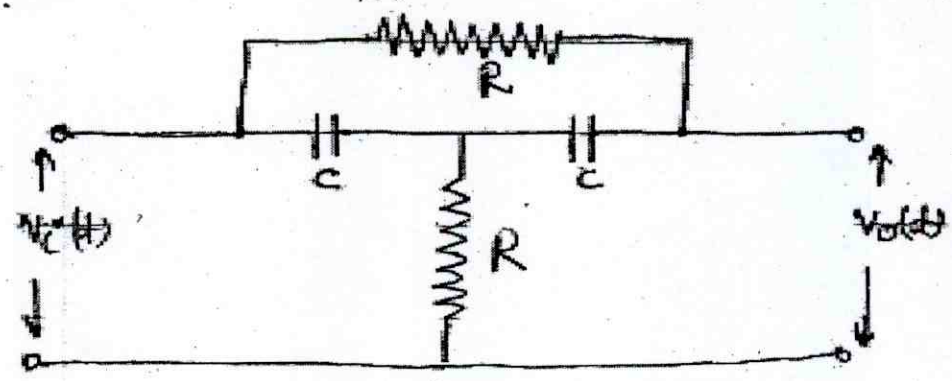

Fig. 2

(8)

OR

1. a) Draw the signal flow graph of the system shown below.

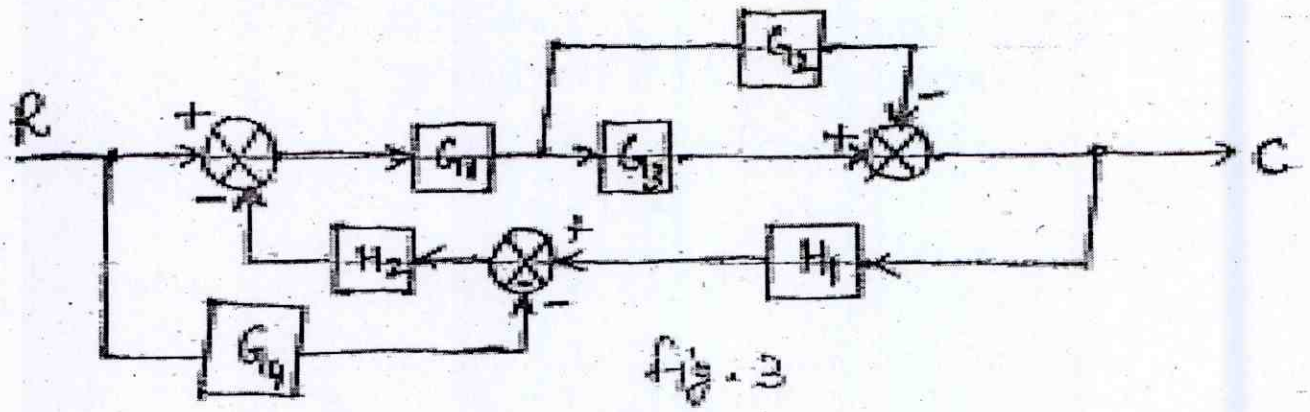

Fig. 3

(8)

b) Determine the over all transfer function (C/R) of the system shown in fig. 3 by block - diagram reduction technique. **(8)**

Unit - II

2. a) Develop the block diagram for armature controlled and field controlled DC servomotor and find its transfer function. **(8)**

b) Write short note on AC techo generator. **(8)**

OR

2. Explain the following :

i) Potentiometer as Error Detector

ii) Stepper Motor

iii) AC servomotor

iv) AC tacho generator **(4×4=16)**

Unit - III

3. a) Find the dynamic error coefficients of the unity feedback system whose forward transfer function is given by $G(s) = \frac{10}{s(s+1)}$ **(8)**

b) Open loop transfer function of second order control system with unity feedback is given below.

$$G(s) = \frac{500}{s(s+15)}$$

i) Draw a block diagram for closed loop system.

ii) Find values of natural frequency (W_n) and damping ratio (δ)

iii) Find the value of % maximum over shoot (M_p) and the time from start of the transient to maximum overshoot (t_p) **(1+2+5=8)**

OR

3. a) A unity feedback servo - driven instrument has an open loop transfer function.

$$G(s)=\frac{10}{s(s+2)}$$

Find.

i) The natural frequency of oscillation (W_n) and damping ratio (δ)

ii) Maximum overshoot (m_p) and the Peak time (t_p)

iii) Steady state error to an input (1+4t) **(10)**

b) A thermometer requires 1 min. to indicate 95% of the response to a step input. Assuming the thermometer to be a first order system, find the time constant. **(6)**

Unit - IV

4. a) The closed loop transfer of an antenna control system is given by

$$T(s)=\frac{k}{s^4+6s^3+30s^2+60s+k}$$

i) Determine the range in which K must lie for the system to be stable.

ii) What should be the upper limit on K if all the poles of T(s) are required to be on the left of the line $\sigma=-1$? **(5+5=10)**

b) How many roots does each of the following polynomials have in the right half of the s - plane.

i) $s^4+2s^3+4s^2+8s+15$

ii) $s^6+4s^5+11s^4+12s^3+26s^2+84s+16$ **(3+3=6)**

OR

4. A unity feedback control system is characterized by the open loop transfer function using $G(s)=\frac{K(s+13)}{s(s+3)(s+7)}$ Using the Routh criterion, calculation the range of values of K for the system to be stable and also check if for K = 1, all the roots for the characteristic equation of the above system have damping factor greater than 0.5.**(16)**

Unit - V

5. Construct the Bode plot on a semilog graph sheet for a unity feed back system whose open loop transfer function is given by

$G(s) = \frac{50}{s(1+s)(1+0.5s)}$ from the Bode plot check the stability of the closed loop system. **(16)**

OR

5. a) Explain the various compensating networks with the help of diagram. **(8)**

b) A unity feedback control system has $G(s) = \frac{1000}{s^2(s+2)(s+5)}$ and H(s) = 1 Draw the Bode plot. **(8)**

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4E 4135

Roll No. _____ [Total No. of Pages : 3

4E 4135

B.Tech. IV Semester (Main/Back) Examination, May-2018
Electronics & Comm.
4EC6A Advanced Engg. Mathematics - II
AI, BM, EI, CRE, EC, PE, PC

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*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.*

UNIT - I

1. a) Show that $u_1x+u_2x^2+u_3x^3+\ldots=\frac{x}{1-x}u_1+\left(\frac{x}{1-x}\right)^2\Delta u_1+\left(\frac{x}{1-x}\right)^3\Delta^2u_1+\ldots.$ **(8)**

b) Using Lagrange's interpolation formula, find the polynomial which passes through the points (0,2), (1,3), (2,12) and (5, 147) **(8)**

OR

1. a) Prove the following relations, where symbols have their usual meaning:

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

ii) $\Delta\log f(x)=\log\left[1+\frac{\Delta f(x)}{f(x)}\right]$ **(8)**

b) Using Newton-Gregory forward interpolation formula, find the sum $S_n=1^3+2^3+3^3+\ldots\ldots+n^3$ **(8)**

UNIT - II

2. a) Find the approximate value of $\int_0^{\pi/2}\sqrt{\cos\theta}\,d\theta$ by dividing the interval into nine ordinates. **(8)**

b) Using Milne's method, find y(2), if y(x) is the solution of $\frac{dy}{dx}=\frac{1}{2}(x+y)$ assuming y(0) = 2, y(0.5) = 2.636, y(1.0) = 3.595 and y(1.5) = 4.968. **(8)**

OR

2. a) From the following table of values of x and y, obtain $\frac{dy}{dx}$ *and* $\frac{d^2y}{dx^2}$ *for* $x=1.2$ **(8)**

x	y	x	y
1.0	2.7183	1.8	6.0496
1.2	3.3201	2.0	7.3891
1.4	4.0552	2.2	9.0250
1.6	4.9530		

b) Given the differential equation $\frac{dy}{dx}=\frac{x^2}{y^2+1}$, with the initial condition y = 0 when x = 0, use Picard's method to obtain y for x = 0.25, 0.5 and 1.0 correct to three places of decimals. **(8)**

UNIT - III

3. a) State and prove Rodrigue's formula for Legendre polynomial. **(8)**

b) Prove that :

i) $xJ_n'(x)=nJ_n(x)-xJ_{n+1}(x)$

ii) $J_n(x)=\frac{2(x/2)^{n-m}}{\Gamma(n-m)}\int_0^1\left(1-t^2\right)^{n-m-1}t^{m+1}J_m(xt)\,dt, n>m>-1$ **(8)**

OR

3. a) Show that : $\exp\left\{\frac{x}{2}\left(z-\frac{1}{z}\right)\right\}=\sum_{n=-\infty}^{\infty}z^nJ_n(x)$ **(8)**

b) Express $P(x)=x^4+2x^3+2x^2-x-3$ in terms of Legendre's polynomials. **(8)**

UNIT - IV

4. a) Suppose on an average 1 house in 1000 in a certain district has a fire during a year. If there are 2000 houses in that district, what is the probability that exactly 5 houses will have a fire during the year? **(4)**

b) A manufacturing firm produces steel pipes in three plants with daily production volume of 500, 1000 and 2000 units respectively. According to past experience it is known that the fractions of defective output produced by the three plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected from a days total production and found to be defective. Find out what is the probability that it came from the first plant? **(6)**

c) Two random variables have the following regression lines : $3x+2y-26=0$ *and* $6x+y-31=0$. Find the mean values and coefficient of correlation between x and y. **(6)**

OR

4. a) A card is drawn from a well-shuffled pack of playing cards. What is the probability that it is either a spade or an ace? **(4)**

b) Find mean and variance of Binimial distribution. **(6)**

c) Calculate the coefficient of correlation between x and y using the following data :

X :	1	3	5	7	8	10
Y :	8	12	15	17	18	20

(6)

UNIT - V

5. a) Prove that the shortest distance between two given points in a plane is always a straight line. **(8)**

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

where $y(0)=0, y(\pi/2)=1, z(0)=0$ *and* $z(\pi/2)=-1$. **(8)**

OR

5. a) Derive Euler - Lagrange's equation. **(8)**

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

$\int_0^1 y^2dx=2, y(0)=0, y(1)=0$. **(8)**

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4E4134

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4E4134

B.Tech. IV Semester (Main/Back) Examination May - 2018
Electronic & Comm.
4EC5A Optimization Techniques

Time : 3 Hours **Maximum Marks : 80**
Min. Passing Marks : 26

*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

Unit - I

1. a) Discuss the classification of optimization, problem's with proper example's. **(8)**

b) Solve the following LPP by graphical method

Max $Z = 8000x_1 + 7000x_2$

s.t. $3x_1 + x_2 \le 66$ **(8)**

$x_1 + x_2 \le 45$

$x_1 \le 20$

$x_2 \le 40$

$x_1, x_2 \ge 0$

OR

1. a) Formulate the following balance transportation problem as a linear programming problem. **(8)**

Warehouses →

		W_1	W_2	W_3	W_4	Availability
Factory ↓	F_1	C_{11}	C_{12}	C_{13}	C_{14}	a_1
	F_2	C_{21}	C_{22}	C_{23}	C_{24}	a_2
	F_3	C_{31}	C_{32}	C_{33}	C_{34}	a_3
Requirements		b_1	b_2	b_3	b_4	

b) Discuss the applications of optimization in the field of Engineering. **(8)**

Unit - II

2. a) Use Big - M method to solve the LPP **(12)**

Minimize $Z = 2x_1 + x_2$

Subject to $3x_1 + x_2 = 3$

$4x_1 + 3x_2 \geq 6$

$x_1 + 2x_2 \leq 4$

$x_1, x_2 \geq 0$

b) Obtain the dual of the following LPP

Maximize $Z = x_1 + 2x_2$

Subject to, $x_1 + x_2 \leq 5$

$3x_1 + x_2 \leq 11$

$x_1 \leq 6$

$x_2 \leq 8$

$x_2 \geq 2$

and $x_1, x_2 \geq 0$ **(4)**

OR

2. a) Use Revised simplex method to solve the following LPP **(8)**

Maximize $Z = 2x_1 + 6x_2$

Subject to, $-x_1 + x_2 \leq 1$

$2x_1 + x_2 \leq 2$

$x_1, x_2 \geq 0$

b) Solve the following LPP

Maximize $Z = 3x_1 + 5x_2$

Subject to, $3x_1 + 2x_2 \leq 18$

$x_1 \leq 4$

and $x_1, x_2 \geq 0$

Discuss the effect on the optimal solution by adding new constraint $x_2 \leq 9$ **(8)**

Unit - III

3. a) Solve the assignment problem for minimization, whose effectiveness matrix is as follows : **(8)**

(Job's)

(Machines)	J_1	J_2	J_3	J_4	J_5
M_1	7	5	9	8	11
M_2	9	12	7	11	10
M_3	8	5	4	6	9
M_4	7	3	6	9	5
M_5	4	6	7	5	11

b) Solve the following transportation problem for minimizing the transportation cost.

To/From	D_1	D_2	D_3	D_4	Supply
S_1	19	30	50	10	7
S_2	70	30	40	60	9
S_3	40	8	70	20	18
Demand	5	8	7	14	34

(8)

OR

3. a) Discuss the following terms for the transportation problem **(8)**

i) Basic Feasible solution

ii) Non Degenerate Basic Feasible solution

iii) Optimal solution

iv) Optimility condition

b) A captain of a cricket team has to allot five middle order batting position to five batsmen. The average runs scored by each batsmen at these positions are given in the table **(8)**

(Batting Position)

Batsman	III	IV	V	VI	VII
A	40	40	35	25	50
B	42	30	16	25	27
C	50	48	40	60	50
D	20	19	20	18	25
E	58	60	59	55	53

Make the assignment so that the expected total average run's scored by these batsman are maximized.

Unit - IV

4. a) Minimize $Z = x_1^2 + 2x_1x_2 + x_2^2 + x_1 - x_2$ by Hooks & Jeenes method, starting from $x_1 = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ Take $\Delta x_1 = \Delta x_2 = 0.8$ **(8)**

b) Minimize $Z = \frac{1}{3}(x_1 + 1)^3 + x_2$

Subject to $-x_1 + 1 \leq 0$

$-x_2 \leq 0$

Using interior penalty method. **(8)**

OR

4. a) Minimize $f(x) = 2x_1^2 + 2x_1x_2 + x_2^2 + x_1 - x_2$ starting from $X_1 = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$ using steepest discent method. **(8)**

b) Solve the following problem by variable transformation techniques.

Maximize $Z = x_1x_2x_3$

Subject to , $x_1 + x_2 + x_3 \leq 60$

$x_1 \leq 36$

and $x_1, x_2, x_3 \geq 0$ **(8)**

Unit - V

5. a) State the Bellman's Principle of optimality and discuss the applications of Dynamic programming. **(8)**

b) Use dynamic programming to solve **(8)**

Minimize $Z = y_1^2 + y_2^2 + y_3^2$

Subject to, $y_1y_2y_3 = 27$

$y_1, y_2, y_3 \geq 0$

OR

5. a) Use dynamic programming to solve the LPP

Maximize $Z = 3x_1 + 4x_2$

Subject to , $2x_1 + x_2 \leq 40$ **(8)**

$2x_1 + 5x_2 \leq 180$

$x_1, x_2 \geq 0$

b) Use dynamic programming to show that

$Z = p_1 \log p_1 + p_2 \log p_2 + p_3 \log p_3$

Subject to, $p_1 + p_2 + p_3 = 1$ is minimum when $p_1 = p_2 = p_3 = \frac{1}{3}$ **(8)**

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4E4133

Roll No. _____ [Total No. of Pages : 2

4E4133

B.Tech. IV Sem.(Main/Back) Examination, May - 2018
Electronics & Comm.
4EC4A Electromagnetic Field Theory

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

Min. Passing Marks : 26

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.*

Unit - I

1. a) Give the basic concept of transformation of one coordinate system to another? **(8)**

   b) Express the vector $B = (10/r)a_r + r\cos\theta a_\theta + a_\phi$, in Cartesian and cylindrical coordinates. Find B (-3,4,0) and B $(5, \pi/2, -2)$. **(8)**

OR

1. a) Given point P (-2, 6, 3) and vector A = ya_x + (x+z) a_y, express P and A in cylindrical and spherical coordinates. Evaluate A at P in the cartesian, cylindrical system. **(8)**

   b) State, Explain and Proof Green's Theorems. **(8)**

Unit - II

2. a) Explain Field Mapping and Concept of field Cells. **(8)**

   b) In a field E = -50y l_x - 50y l_y + 30y l_z V/m, calculate the different amount of work done in moving $2\mu C$ Charge a distance $5\mu C$ from A (1,2,3) to B (2,4,1). **(8)**

OR

2. a) Explain and Proof Gauss's Law. **(8)**

   b) Explain the Phenomena of Continuity equation for current? **(8)**

Unit - III

3. a) Explain Bio Savart Law? (8)

   b) Describe the concept of Energy stored in magnetic field? (8)

OR

3. a) Explain Ampere's Circuital Law? (8)

   b) Explain analogy between electrical and magnetic field? (8)

Unit - IV

4. a) Explain the phenomena of Reflection of uniform plane wave? (8)

   b) Explain Maxwell's Equations for time varying fields? (8)

OR

4. a) An A.C. voltage source $V = V_0 \sin(wt)$ is connected across a parallel plate capacitor C. Verify that the displacement current in the capacitor is the same as the conduction current in the wire. (8)

   b) Can a static magnetic field exist in the interior of a perfect conductor? Explain. Can a time varying magnetic field explain. (8)

Unit - V

5. a) Explain the EMI error in equipments. (8)

   b) What is Susceptibility testing, where and for what purpose it is used explain. (8)

OR

5. Write short note on :

   a) Shielding and Grounding. (8)

   b) Radiation from a small current element. (8)

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4E 4132

Roll No. _____ [Total No. of Pages : 3

4E 4132

B.Tech. IV Semester (Main/Back) Examination, May 2018
Electronics & Comm.
4EC3A Electronic Measurement & Instrumentation

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

Min. Passing Marks : 26

*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.*

UNIT - I

1. a) Define the following for Gaussian distribution of data: **(8)**

(i) Precision Index

(ii) Probable Error

(iii) Standard deviation of mean

(iv) Standard deviation of Standard deviation

b) The solution for the unknown resistance for a wheat stone bridge is- **(8)**

$P=Q.\ R/S$

Where - $S = 100 \pm 0.5\%\ \Omega$

$R = 1000 \pm 0.5\%\ \Omega$

$Q = 842 \pm 0.5\%\ \Omega$

Determine the magnitude of the unknown resistance and limiting error in Percentage and in ohm for the unknown resistance P.

OR

1. a) Differentiate between accuracy and Precision with the help of suitable examples?. **(8)**

b) A set of voltmeter reading was taken by five observers as 99.7, 99.8, 100.0, 100.2 and100.3. Calculate- **(8)**

i) The airthmatic mean

ii) The average deviation

iii) The standard deviation

iv) The variance

Unit - II

2. a) Why is an electronic voltmeter more accurate than an ordinary voltmeter? Draw its block diagram and explain its principle of operation? **(8)**

b) What do you mean by the term "Q-factor". Explain the working of Q-meter. **(8)**

OR

2. a) Explain the working principle of vector impedance meter? **(8)**

b) What do you mean by grounding and shielding? Discuss the techniques to protect the measuring instruments. **(8)**

UNIT - III

3. a) What is the difference between a CRT and CRO? Draw a neat block diagram of a general purpose CRO and explain functions of each block? **(8)**

b) An electrically deflected CRT has a final anode voltage of 2000V and Parallel deflecting Plates 1.5cm long and 5mm apart. If the screen is 50cm from the centre of deflecting Plates, find: **(2×4=8)**

(i) Speed of beam

(ii) Deflection factor of CRT

OR

3. Explain following in details: **(8+8=16)**

a) Multibeam and multi trace oscilloscope

b) Dual Storage CRO.

Unit - IV

4. a) Explain the block diagram of frequency Synthesized Signal generators? **(8)**

b) Explain the working of a sweep frequency generator. **(8)**

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OR

4. a) Write short note on-. **(8+8=16)**

   (i) Metrodyne wave analyser

   (ii) Selective wave analyser.

UNIT - V

5. Write short notes on the following- **(8+8=16)**

   a) Bourden Tubes

   b) LVDT

OR

5. Write short notes on the following- **(8+8=16)**

   a) Ultrasonic flow meters

   b) RTD

Unit - III

3. a) Explain all the properties of joint density function (6)

   b) The joint pdf of a bivariate R.V. (X, Y) is given by

$$f_{xy}(x,y)=\begin{cases}\frac{kx}{y}; & 1<x<2 \\ & 1<y<2 \\ 0 & elsewhere\end{cases}$$

   a) determine k (5)

   b) are X and Y independent (5)

OR

3. Consider the two random variable X and Y with joint pdf $f_{XY}(x,y)$. Let Z = X+Y

   a) determine the pdf of Z (12)

   b) determine the pdf of Z if X and Y are independent (4)

Unit - IV

4. Explain the followings ;

   a) Properties of MGF (8)

   b) Liapounoff's and Lindberg - Levy's form of central limit theorem. (8)

OR

4. Explain the followings ;

   a) Covariance of multiple random variables (8)

   b) Co - relation co - efficient of multiple random variables. (8)

Unit - V

5. If Y(t) be the output of an LTI system with impulse response h(t) when a WSS random process X(t) is applied as input show that

   a) $S_{XY}(w)=H(w)S_{XX}(w)$ (8)

   b) $S_{YY}(w)=H^{*}(w)S_{XY}(w)$ (8)

OR

5. Consider a N/w with the power transfer function $H(w)=jw$. The input to this N/w is WSS process X(t), Show that

   a) $R_{XY}(\tau)=\frac{d}{dz}R_{XX}(\tau)$ (8)

   b) $R_{YY}(\tau)=\frac{-d^2}{dz^2}R_{XX}(\tau)$ (8)

4E 4131

Roll No. _____ [Total No. of Pages : 2]

4E 4131

B.Tech. IV semester (Main&Back) Examination, May - 2018
Electronics & Comm.
4EC2A Random Variables & Stochastic Processes

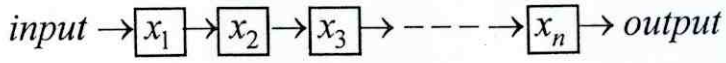
Time : 3 Hours **Maximum Marks : 80**
Min Passing Marks : 26

*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.*

Unit - I

1. a) Explain the following :
   i) Random experiments (4)
   ii) Sample space (2)
   iii) Events (2)

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



OR

1. a) Write down all the properties of joint and conditional probability (8)
   b) Explain the followings :
   i) Axiomatic Definition of probability (4)
   ii) Relative frequency definition of probability. (4)

Unit - II

2. Explain the classification of random variables in details. (16)

OR

2. Determine the mean and variance of the following r.v.
   a) Poisson random variable (8)
   b) Normal random variable (8)

4E 4120

Roll No. _____ Total No. of Pages :4

4E 4120

B.Tech. IV Semester (Main/Back) Examination, May- 2018

Electrical & Electronics Engg.

4EX1A Analog Electronics

EE,EX,EC,EI

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

Min Passing Marks : 26

*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.*

UNIT - I

1. a) State the three fundamental assumptions which are made in order that the expression $A_f = \frac{A}{(1+A\beta)}$ be satisfied exactly.

   b) Calculate the gain with and without feedback for the FET amplifier circuit of fig.(a) and the following circuit values: R_1 =80kΩ, R_2=20KΩ, R_o=10KΩ, R_D=10KΩ and g_m=4000 μs,

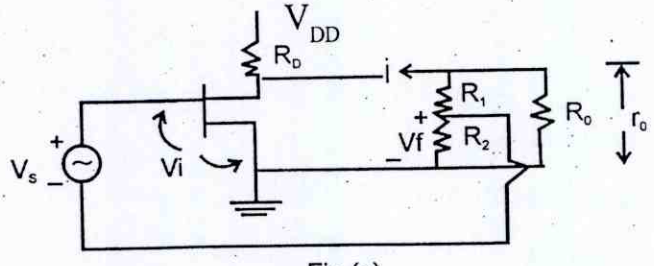


Fig (a)

(OR)

1. a) For a voltage series feedback amplifier, find expression for input and output resistance.

b) An amplifier with an open loop voltage gain of 1,000 delivers 10W of output power at 10 percent second harmonic distortion when the input signal is 10mv. If 40dB negative voltage-series feedback is applied and the output power is to remain at 10W, determine

a) The required input signal

b) The percent harmonic distortion.

UNIT - II

2. a) Sketch the circuit diagram of Wein bridge oscillator and explain its working also derive the expression for output frequency.

b) An FET phase shift oscillator having g_m=6000 μs, r_d=36kΩ, and feedback resistor R=12KΩ is to operate at 2KHz. Select 'C' for specified oscillator operation.

(OR)

2. a) Explain the working of schmitt trigger. Also give its application.

b) A crystal has the following parameters L=0.33H, C=0.065PF, C^1=1.0PF, and R=5.5KΩ.

i) Find the series resonant frequency.

ii) By what percent does the parallel-resonant frequency exceed the series resonant frequency.

iii) Find the Q of the Crystal.

UNIT - III

3. a) Derive the expression for the CE Short Circuit current gain Ai as a function of frequency.

b) Show that at low frequencies the hybrid π model with $r_{b'c}$ and r_{cc} taken as infinite reduces to the approximate CE. h-parameter model.

(OR)

3. a) The following low frequency parameters are known for a given transistor at I_c=10MA, V_{CE}=10v and at room temperature.

h_{ie}=500Ω, h_{oe}=10^{-5}A/v

h_{fe}=100, h_{re}=10^{-4}

At the same operating point, f_T=50M. and C_{ob}=3PF, Compute the values of all the hybrid - π parameters

b) i) Prove that $h_{ie} = r_{bb} + r_{b'e}$

ii) Assuming $r_{bb'} << r_{b'e}$ how does $r_{b'e}$ vary with (I_c)?

UNIT - IV

4 a) Sketch and explain the circuit of double tuned amplifier with the help of frequency response plot.

b) A tuned amplifier is required to have a voltage gain of 30 at 10.7MHz with 200KHz BW. An FET with g_m=5MA/V and r_d=100kΩ is available calculate values of tank circuit elements.

(OR)

4. a) What is the effect of cascading single tuned amplifiers on bandwidth? Derive the expression for it.

b) A single tuned amplifier using FET has tank circuit components

L=100 μH, R=5 Ω and c=1000PF,

The FET used has r_d=500kΩ and g_m=5MA/V find

(i) Resonant frequency

(ii) Tank Ckt impedance at resonance

(iii) Voltage gain at resonance

(iv) Band width.

UNIT - V

5. a) With the help of circuit diagram explain the working of a transformer coupled class 'A' power amplifier.

b) A power transistor operated in class A operation delivers a maximum of 6W to a 8Ω load with the supply voltage of 25V. The Q point is adjusted for a symmetrical.

Swing. Calculate :

(i) Step down turns ratio

(ii) Peak collector current

(iii) Efficiency

(OR)

5. a) Show that the even harmonics are cancelled at the output of a push pull class B ideal amplifier.

b) For class A CE transistor amplifier, the operating point is located at I_c=250MA and V_{CE}=8V. Due to the input signal, the output collector current goes in between 450MA and 40MA while the V_{CE} swing between 1.5v, to 1v. find

(i) The output power delivered

(ii) The input power

(iii) The collector efficiency

(iv) The power dissipated by transistor.