

Roll No.

Total Pages : 3

BT-4/J-25

44156

APPLIED AND COMPUTATIONAL MATHEMATICS

Paper-BS-207A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each Unit. Each question carries equal marks.

UNIT-I

1. (a) Solve : $(e^y + 1) \cos x \, dx + e^y \sin x \, dy = 0$.
- (b) Solve : $\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + 10y = -37 \sin 3x$, and find the value of y when $x = \frac{\pi}{2}$ being given that $y = 3$, $\frac{dy}{dx} = 0$ when $x = 0$.
2. (a) Solve the partial differential equation $(x^2 - y^2 - yz)p + (x^2 - y^2 - xz)q = z(x - y)$.
- (b) Find the complete solution of $z^2 = pqxy$.

UNIT-II

3. (a) Evaluate $\int_0^{4a} \int_{\frac{x^2}{4a}}^{2\sqrt{ax}} dydx$ by changing the order of integration.

- (b) Find by double integration, the area lying between the curves $y = 4x - x^2$ and $y = x$.
4. (a) Find the directional derivative of $\Phi = (x^2 + y^2 + z^2)^{-\frac{1}{2}}$ at the point P (3, 1, 2) in the direction of the vector $yz \hat{i} + xz \hat{j} + xy \hat{k}$.
- (b) Apply Green's theorem to evaluate $\oint_C [(2x^2 - y^2)dx + (x^2 + y^2)dy]$, where C is the boundary of the area enclosed by the x-axis and the upper half of circle $x^2 + y^2 = a^2$.

UNIT-III

5. (a) Find the Laplace transform of $\left[\frac{e^{2t} - \cos 3t}{t} \right]$.
- (b) Find the inverse Laplace transform of $\log \left(1 + \frac{1}{s^2} \right)$.
6. (a) Using Convolution theorem, find
- $$L^{-1} \left\{ \frac{s^2}{(s^2 + a^2)(s^2 + b^2)} \right\}$$
- (b) Solve the differential equation by using Laplace transform

$$\frac{d^2x}{dt^2} + 2\frac{dx}{dt} + 5x = e^{-t} \sin t, \text{ where } x(0) = 0, x'(0) = 1.$$

UNIT-IV

7. (a) Find a real root of the equation $\cos x = x e^x$ by using the method of false position, correct to four decimal places.

(b) The velocity v of a particle at distance s from a point on its linear path is given in the following table :

s (m) :	0	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0
v (m/sec) :	16	19	21	22	20	17	13	11	9

Apply Simpson's rule to estimate the time taken by the particle to traverse the distance of 20 meters.

8. (a) Find by Taylor's series method, the values of y at $x = 0.1$ and $x = 0.2$ to five places of decimals from

$$\frac{dy}{dx} = x^2y - 1, y(0) = 1.$$

(b) Solve $\frac{dy}{dx} = x - y^2, y(0) = 1$, to find $y(0.2)$ by taking $h = 0.1$ using Runge-Kutta method of order 4.

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BT-4/J-25

DIGITAL COMMUNICATION

Paper : EC-202A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. (a) Discuss Pulse Amplitude Modulation technique. Derive an expression for PAM signal. (7)
- (b) Draw block diagram of PCM transmitter and receiver. Explain working of each block in brief. (8)
2. (a) Discuss Delta modulation technique. How is it different from PCM? Discuss DM algorithm. Also derive an expression for signal to quantization noise ratio in delta modulation. (10)
- (b) Explain Time Division Multiplexing technique. (5)

UNIT-II

- 3 (a) What is matched filter? Why is it required? Derive an expression for transfer characteristics of matched filter. (8)

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- (b) What is ideal Nyquist channel? Write its characteristics. Mention merits and limitations of ideal Nyquist channel. (7)
4. (a) What is equalization? Draw diagram for adaptive equalizer and explain its working. (8)
- (b) Discuss Least Mean Square algorithm. Mention its application. (7)

UNIT-III

5. Explain coherent detection of signals in presence of noise. What is probability of error in such case? State maximum likelihood rule to reduce error. (15)
6. Explain QPSK and BFSK modulation schemes in detail. Draw signal space diagram, transmitter and receiver diagram for both modulation techniques. (15)

UNIT-IV

7. (a) Mention various factors that need tradeoffs while choosing a digital modulation technique. (7)
- (b) Explain with the help of a diagram working of Viterbi receiver. (8)
8. (a) Discuss tapped delay line equalization technique. (8)
- (b) Mention need of synchronization for carrier recovery. Mention various synchronization techniques. (7)

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(8)

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ANALOG CIRCUITS

Paper : EC-206A

Time : Three Hours]

[Maximum Marks : 75

- Note :** (i) There are *eight* questions in this paper. Each question carries 15 marks.
(ii) Attempt *five* questions selecting at least *one* question from each Section.

SECTION-I

1. (a) Differentiate between voltage amplifier and current amplifiers and derive their gains. (10)
(b) Draw and explain the CS amplifier with current source load. Derive an expression for A_v . (5)
2. (a) In a single stage CB amplifier circuit, $R_E = 20\text{ K}$, $R_C = 10\text{ K}$, $V_{EE} = -20\text{ V}$, $V_{CC} = 20\text{ V}$, $R_L = 10\text{ K}$. Find out R_i , R_o , A_i , A_v and power gain in dB. (8)
(b) Differentiate between transconductance and trans-resistance amplifiers. (7)

SECTION-II

3. (a) Show that the transformer coupled class A amplifier, maximum efficiency is 50%. (7)

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(b) Explain the frequency response of amplifier in different regions. (8)

4. What are the advantages and disadvantages of the introduction of negative feedback in amplifiers? Explain. An amplifier has a mid band gain of 125 and a bandwidth of 250 KHz. If 4% negative Feedback is introduced, find the new bandwidth and gain. (15)

SECTION-III

5. (a) Derive conditions for sustained oscillations in a RC Phase shift oscillator. (7)

(b) In a colpitt's oscillator, the values of the inductors and capacitors in the tank circuit are $L = 40 \text{ mH}$, $C_1 = 100 \text{ pF}$, $C_2 = 500 \text{ pF}$. (8)

(i) Find the frequency of oscillation.

(ii) If the output voltage is 10 V, find the feedback voltage.

(iii) Find the minimum gain, if the frequency is changed by changing 'L' alone.

(iv) Find the value of c_1 , for a gain of 10.

(v) Also find the new frequency of oscillation.

6. What is 555 timer? Draw and explain its pin diagram. Explain the working and applications of 555 timer as monostable multivibrator. (15)

SECTION-IV

7. (a) Draw the circuit of differential amplifier with one Op-Amp and derive the expression of voltage gain? (7)
- (b) Explain the working of Schmitt trigger circuit using op-amp; and also sketch the hysteresis plot. (8)

8. (a) Briefly explain summing amplifier. Draw an adder circuit for the given expression

$$V_o = -(0.1 V_1 + V_2 + 5 V_3). \quad (8)$$

- (b) Explain minimum sustainable voltage and maximum usable voltage. (7)
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MICROPROCESSORS AND MICROCONTROLLER

Paper : EC-210A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt five questions in all, selecting at least one question from each unit. All questions carry equal marks.

UNIT-I

1. Draw and explain the architecture and pin diagram of the 8085 microprocessors. 15
2. Using a suitable architecture diagram of the 8086, explain in detail the various tasks performed by the BIU and EU units. Also, explain the function of each register of 8086 and show how they are grouped. 15

UNIT-II

3. (a) Draw the architecture diagram of 8051 and explain the working of the following :
 - (i) PC, DPTR, A, B and PSW.
 - (ii) RAM and Clock.
 - (iii) Stack. 10
- (b) Explain the function of pins no. 29, 30, and 31 in 8051. 5

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4. (a) Explain the need and uses of timers in microcontroller-based systems. How does a timer work? 5
- (b) Explain how the TCON and TMOD registers are used to control the operation of the timer/counter? 10

UNIT-III

5. Write an assembly program for 8086 to perform the multiplication and division of two 16-bit hexadecimal numbers i.e. 4020 H and 3020 H. 15
6. Write an assembly program for 8051 using two 8-bit numbers i.e. 30 H and 35 H for the following arithmetic and logical instructions :
- (i) ADD
 - (ii) SUBB
 - (iii) MUL
 - (iv) DIV
 - (v) XOR
- Also, write flags affected after the execution of each program. 15

UNIT-IV

7. Design an interface between 8086 CPU and two chips of 16K×8 EPROM and two chips of 32K×8 RAM. Select the starting address of EPROM suitably. The RAM address must start at 00000H. 15
8. Explain operation, programming and interfacing diagram of ADCs with 8051. 15

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ELECTROMAGNETIC FIELD THEORY

Paper : EC-214-A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. Write short note on Gauss law in Electrostatics and its applications. 15
2. Write short note on :
 - (a) Gauss Divergence Theorem.
 - (b) Stokes Theorem.
 - (c) Method of Images. 15

UNIT-II

3. Explain Boundary conditions of Electric and Magnetic field. 15
4. Explain Maxwells equations in differential and integral form. 15

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UNIT-III

5. Derive Wave equation for conducting medium. 15
6. Write short note on :
- (a) Polarisation and its types.
 - (b) Reflection and Refraction of uniform plane wave.

15

UNIT-IV

7. Derive the expression of Transmission Line Equation. 15
8. Explain the structure of Rectangular and Circular waveguide. What do you understand by TE, TM and TEM modes. Also explain cut off and guide wavelength. 15

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BT-4/J-25

BASICS OF ANALOG COMMUNICATION

Paper : ES-208A/EEN-202A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt any *five* questions in all, selecting at least *one* question from each unit.

UNIT-I

1. (a) Define Noise? State the different types of Noise alongwith the reasons for these noises. Calculate thermal noise power available from any resistor at room temperature 290 K for a bandwidth of 2 MHz and also calculate noise voltage at 100 Ω resistor. 10
- (b) Define noise factor. Calculate noise factor as function of additional noise. 5
2. (a) Define Amplitude Modulation. Obtain a mathematical expression to represent AM signal. Draw spectrum of AM wave. An AM transmitter radiates 9 kW of power when the carrier is unmodulated and 10.125 kW of power when the

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carrier is sinusoidal modulated. Find the modulation index and Percentage modulation. Now if another sine wave corresponding to 40% modulation is transmitted Simultaneously. Calculate total radiated power. 7

- (b) In frequency modulation context, explain frequency deviation, percent modulation, phase deviation and modulation index. Give their expressions also. 8

UNIT-II

3. (a) Describe square law modulation method of AM generation. State its merits and demerits. 8
- (b) Explain with the help of neat diagram working of ring modulator. 7
4. Draw block diagram of Super-heterodyne AM receiver and explain function of each block in detail. 15

UNIT-III

5. (a) Explain Armstrong method of FM generation. 10
- (b) Discuss the concept of noise triangle. What inference can you draw from noise triangle. 5
6. (a) With the necessary circuit diagram, explain the functionality of balanced slope detector for FM. 8

- (b) Draw pre-emphasis and de-emphasis circuits. What is their purpose? Explain their working. 7

UNIT-IV

7. (a) Explain the Frequency discrimination method for generating SSB signal. 10
(b) Discuss application of VSB modulation in TV transmission. 5
8. (a) Derive an expression for mathematical representation of PAM signals. 8
(b) Compare PWM and PPM. 7
-

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46186

ORGANIZATIONAL BEHAVIOR

HM-901A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. What kind of challenges faced by organizations due to workforce diversity in today's Scenario ? How organizations manage it effectively ? Also explain about management of behavioural issues by managers.
2. What are the approaches of Organizational behavior ? Explain with suitable examples.

Unit II

3. Define personality and its traits ? How the study of personality does help in understanding the Organizational behaviour ?

4. What do you mean by leadership ? Which styles and approaches are most relevant as well as effective in modern day business environment and why ?

Unit III

5. What are the key elements of motivation ? Discuss in detail the Maslow's need hierarchy theory and ERG theory of motivation.
6. Write down about the conflicts and negotiation ? What are the causes of group conflicts and how it can be managed by the organizations ?

Unit IV

7. Define stress at workplace, its causes & types. How can stress managed by different techniques ?
8. Explain the following :
 - (a) Communication and its process
 - (b) Organizational Change and resistance to change .



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46257

CONTROL SYSTEM ENGINEERING

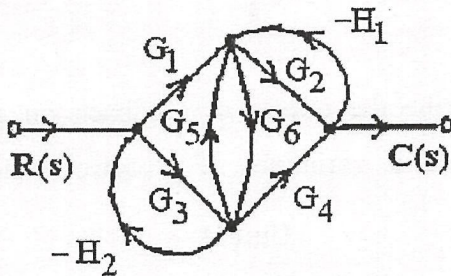
Time : Three Hours]

[Maximum Marks : 75

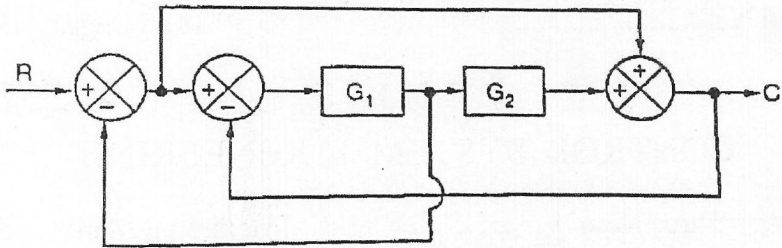
Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

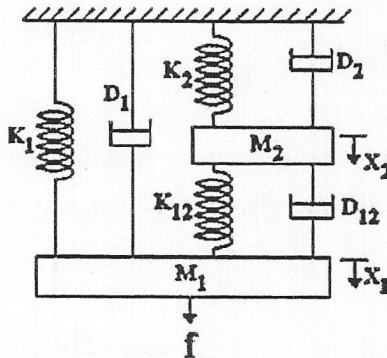
1. (a) Find the overall transfer function by using Mason's gain formula for the signal graph shown below : 8



- (b) For the given block diagram find the overall transfer function using the block diagram reduction technique : 7



2. (a) Determine the system equations for the system as shown in figure below : 9



- (b) Describe the effects of feedback on sensitivity to parametric variations of a control system. 6

Unit II

3. (a) A unity feedback control system has $G(s) = 1/[s(s + 2)]$. The input to the system is given by $r(t) = 2 + 3t + 2t^3$. Determine the generalized error coefficients and steady state error. 10

- (b) Comment on the stability of the system described by following polynomial using Routh Criterion :

$$S^6 + S^5 + 3S^4 + 3S^3 + 3S^2 + 2S + 1 = 0. \quad 5$$

4. Consider a unity feedback control system with an open loop transfer function of :

$$G(s) = \frac{K(S+1)(S+2)}{(S+0.1)(S-1)}$$

- (i) Draw the root locus of the system with gain 'K' as a variable.
- (ii) Determine the asymptotes, centroid, breakaway point and the gain at which root locus crosses imaginary axis.
- (iii) Also find the value of gain 'K' for which the closed loop system is critically damped ? 15

Unit III

5. (a) Explain the correlation between time and frequency response with the help of necessary expressions. 7

- (b) Sketch the Nyquist plot and determine the stability of a unity feedback control system whose open loop transfer function is as follows :

$$G(S)H(S) = \frac{4(S-1)}{(S+2)} \quad 8$$

6. Sketch the BODE plot for the following transfer function :

$$G(s) = \frac{50}{S(1+0.25S)(1+0.1S)}$$

Determine the :

- (i) Gain Crossover Frequency.
- (ii) Phase Cross Over frequency.
- (iii) Phase Margin.
- (iv) Gain Margin.
- (v) Stability of the System. 15

Unit IV

7. (a) Obtain the state model for the given transfer function :

$$G(s) = \frac{Y(S)}{U(S)} = \frac{K(C_2S + C_1)}{(S^3 + a_3S^2 + a_2S + a_1)} \quad 8$$

(b) A system is characterized by the following transfer

function $\frac{Y(s)}{U(s)} = \frac{2}{s^3 + 6s^2 + 11s + 6}$. Find the state

and output equation in matrix form and also test the controllability and observability of the system.

7

8. (a) Find the state transition matrix and then find the time domain solution of the given system

$$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} x + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u(t), \text{ where } U(t) \text{ is the unit step}$$

input and initial condition is $x(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$? 10

(b) Explain the Lag-Lead Compensation in detail. 5



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46258

VERILOG HDL

EC-306A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Describe ASIC design and development flow. 10
- (b) Describe test bench with example. 5
2. Explain the following terms : 4,5,6
 - (i) White space characters
 - (ii) Data types
 - (iii) Strengths.

Unit II

3. (a) Describe tristate gates and different types of delays. 8
- (b) Design and write a program for a byte comparator using gate level modeling. 7
4. Explain case x and case z. Also design priority encoder using behavioral modeling. 15

Unit III

5. (a) Explain different types of operators with examples. **10**
- (b) Write a program for BCD adder using dataflow modeling. **5**
6. Explain basic switch primitives. Also design 3-input NAND gate using active pull up. **5,10**

Unit IV

7. Explain UDPs in detail. Also design a UDP for full adder. **15**
8. (a) Differentiate between functions and tasks. **5**
- (b) Describe the following : **5,5**
- (i) Compiler directives
- (ii) Parameters.



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46259

ANTENNAS AND PROPAGATION

ECP-6A

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Explain the near and far field regions in antenna radiation. How is the radiation pattern affected in both ? 7
- (b) Derive an expression for the radiation resistance and field components of a short dipole ? 8
2. (a) Define and explain the terms : Directivity, Efficiency, Beamwidth and Antenna Temperature. $4 \times 2 = 8$
- (b) Derive the field expressions and explain the radiation characteristics of a halfwave dipole antenna. 7

Unit II

3. (a) Explain the principle of pattern multiplication. How does it simplify array analysis ? 7
- (b) Derive the array factor of a broadside array of N isotropic elements. 8
4. (a) Describe the working principle and radiation pattern of a Yagi-Uda antenna. Where is it commonly used ? 8
- (b) A two-element isotropic array is spaced $\lambda/2$ apart and fed in phase. Derive and sketch the resulting radiation pattern. 7

Unit III

5. (a) Explain the structure and working of a rectangular microstrip patch antenna. Include any one feeding technique. 7
- (b) Compare and contrast the radiation properties of a log-periodic antenna. 8
6. (a) Describe the construction and radiation mechanism of a horn antenna. How is it used in practice ? 8

- (b) Explain the working of a frequency-independent conical spiral antenna and its advantages in broadband applications. 7

Unit IV

7. (a) Explain duct propagation and troposcatter propagation. In what scenarios are they significant ? 5+5=10
- (b) A wave is transmitted using sky wave propagation. Given the virtual height (h) = 250 km and critical frequency (f_c) = 6 MHz, calculate the MUF for a path distance of 2500 km ? 5
8. (a) Define critical frequency and maximum usable frequency (MUF). Derive the relation between them. 8
- (b) Describe Space wave propagation. What factors affect its efficiency and reliability ? 7



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46264

MULTIMEDIA COMMUNICATION

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting at least *one* question from each Section. All questions carry equal marks.

Section I

1. (a) Explain data networks and its packet mode of operation with the help of diagram. 8
(b) Differentiate between ISDN and B-ISDN networks. 7
2. How text, images and audio represented in multimedia communication ? Explain each of them with the help of examples. 15

Section II

3. (a) With the help of examples, explain different compression principles. 8

- (b) Differentiate between entropy encoding and source encoding in detail. 7
4. Explain JPEG standards in detail. Why JPEG standard divides the image into blocks before DCT transformation ? Why is quantization used in JPEG process ? 15

Section III

5. (a) What is the difference between DPCM and ADPCM ? Explain with the help of their block diagrams and working. 10
- (b) Explain MEG audio coders with the help of block diagram. 5
6. Differentiate between motion estimation and compensation. Differentiate between I and P frames of Video compression with the help of their block diagrams. 15

Section IV

7. What is time stamping ? Why is it required ? Explain multimedia synchronization along with its requirements.

15

8. What are CBIR systems ? What are its applications in real life ? Also explain some feature extraction techniques.

15



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47305

BT-7/J-25

DIGITAL IMAGE PROCESSING

Paper : ECP-17A

Time : Three Hours]

[Maximum Marks : 75

Note : There are eight questions in total organized into four units. Candidates have to attempt *five* questions selecting atleast *one* from each unit. All questions carry equal marks.

UNIT-I

1. Draw the block diagram of fundamental steps in digital image processing. Explain each block in detail. (15)
2. Explain the color models available for image processing. Define primary and secondary colors. Describe with an example how to convert one color model to another? (15)

UNIT-II

3. Given the following kernel and image :

$$w = \begin{bmatrix} 1 & 2 & 1 \\ 2 & 4 & 2 \\ 1 & 2 & 1 \end{bmatrix} \quad \text{and} \quad f = \begin{bmatrix} 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$$

Compute the convolution of the two.

(15)

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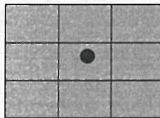
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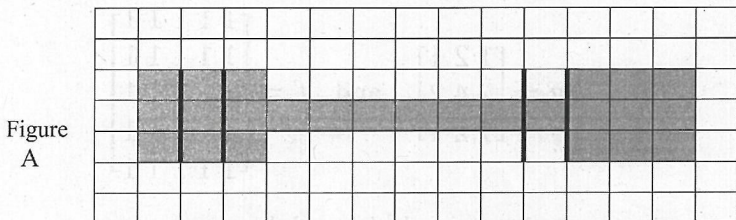
4. What do you understand by image smoothing and sharpening? Explain atleast three techniques each in spatial and frequency domain for image smoothing and sharpening. (15)

UNIT-III

5. Explain Huffman and arithmetic coding algorithms for image compression. Suitable examples may be considered to explain the algorithm procedure. (15)
6. Show all intermediate steps of your computations for the following :
- Obtain the opening of the figure A below using a 3×3 SE of 1s.
 - Repeat.
 - For closing operation. (15)



SE



UNIT-IV

7. Explain the video formation and video frame classification in detail. (15)
 8. Explain the patterns and pattern classes in detail. (15)
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48309

ARTIFICIAL INTELLIGENCE

Paper-ECP-21A

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. What do you understand by Artificial intelligence? What is the need of it? Explain its applications in detail. 15
2. What is a Classifier? Explain the Logistic regression classifier and a support vector machine in detail. 15

UNIT-II

3. Differentiate between supervised and un-supervised learning. Explain atleast one algorithm of each. 15
4. What do you understand by Clustering? Explain the k-means Clustering algorithm. 15

UNIT-III

5. Define GA. Describe its fundamental concepts in detail. 15

6. Differentiate between Face and Eye detection and tracking. Elaborate them in detail. 15

UNIT-IV

7. What is a Perceptron? Describe its use in building a Neural network. Draw the diagram of a Multilayer perceptron and explain its operation. 15
8. Describe reinforcement learning algorithm in detail. 15

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48312

SATELLITE COMMUNICATION

Paper-ECP-24A

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

प्रत्येक इकाई में से कम-से-कम **एक** प्रश्न का चयन करते हुए, कुल **पाँच** प्रश्नों के उत्तर दीजिए। सभी प्रश्नों के अंक समान हैं।

UNIT-I (इकाई-I)

1. (a) Discuss in detail the Kepler's 2nd and 3rd laws of Orbital Mechanics. Draw diagrams where necessary.

केप्लर के कर्क्षीय यांत्रिकी के दूसरे और तीसरे नियमों पर विस्तार से चर्चा कीजिए। जहाँ आवश्यक हो वहाँ चित्र बनाएँ।

- (b) The apogee and perigee distances of a satellite orbiting in an elliptical orbit are respectively 50000 km and 8000 km. Determine the following:

दीर्घवृत्ताकार कक्षा में परिक्रमा कर रहे एक उपग्रह की अपभू और उपभू दूरियाँ क्रमशः 50000 किमी और 8000 किमी हैं। निम्नलिखित का निर्धारण कीजिए:

(i) Semi-major axis of the Elliptical orbit.

दीर्घवृत्तीय कक्षा की अर्ध-प्रमुख अक्ष।

(ii) Orbit Eccentricity.

कक्षा उत्केन्द्रता।

(iii) Distance between the Centre of the Earth and the centre of the Elliptical orbit. 15

पृथ्वी के केंद्र और दीर्घवृत्तीय कक्षा के केंद्र के बीच की दूरी।

2. What are Look angles? Derive the equation for the generation of Elevation angle. Also, discuss about subsatellite point. 15

लुक एंगल क्या हैं? एलिवेशन एंगल की उत्पत्ति के लिए समीकरण निकालें। साथ ही, सबसैटेलाइट पॉइंट के बारे में भी चर्चा कीजिए।

UNIT-II (इकाई-II)

3. What is Telemetry? Discuss in detail TTC& M system with the help of a block diagram. 15

टेलीमेट्री क्या है? ब्लॉक डायग्राम की सहायता से टी.टी.सी.एंड.एम. प्रणाली पर विस्तार से चर्चा कीजिए।

4. (a) What is Attitude control? Why it is used? Also, discuss about Orbit control.

एटीट्यूड कंट्रोल क्या है? इसका उपयोग क्यों किया जाता है? साथ ही, ऑर्बिट कंट्रोल के बारे में भी चर्चा कीजिए।

- (b) What are Transponders? Discuss the working of Bent pipe and double conversion Transponder. 15

ट्रांसपोण्डर क्या हैं? बेंट पाइप और डबल कन्वर्जन ट्रांसपोण्डर की कार्यप्रणाली पर चर्चा कीजिए।

UNIT-III (इकाई-III)

5. (a) Derive and explain the basic transmission theory using the Link equation.

लिंक समीकरण का उपयोग करके मूल संचरण सिद्धांत को व्युत्पन्न और व्याख्या कीजिए।

- (b) Write the steps about Communication link design procedure. Also, discuss about Rain attenuation. 15

संचार लिंक डिजाइन प्रक्रिया के बारे में चरण लिखिए। साथ ही, वर्षा क्षीणन के बारे में भी चर्चा कीजिए।

6. Derive the relation between System Noise temperature and G/T ratio. Also, discuss the types of RF to IF conversion systems used in this using suitable diagrams. 15

सिस्टम शोर तापमान और G/T अनुपात के बीच संबंध स्थापित कीजिए। साथ ही, उपयुक्त आरेखों का उपयोग करके इसमें उपयोग किए जाने वाले RF से IF रूपांतरण प्रणालियों के प्रकारों पर चर्चा कीजिए।

UNIT-IV (इकाई-IV)

7. Write short notes on the following :

15

निम्नलिखित पर संक्षिप्त टिप्पणियाँ लिखिए:

(a) GPS systems.

जीपीएस प्रणाली।

(b) DBS-TV.

डीबीएस-टीवी।

8. What are Multiple Access Techniques? Compare FDMA, TDMA and DAMA techniques with necessary diagrams. 15

मल्टीपल एक्सेस तकनीकें क्या हैं? FDMA, TDMA और DAMA तकनीकों की तुलना आवश्यक आरेखों के साथ कीजिए।

Roll No.

Total Pages : 3

BT-8/J-25

48317

NEURAL NETWORKS AND FUZZY LOGIC

Paper-ECO-14A

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. (a) What is an Artificial neural network? Explain its characteristics and learning methods. 8
- (b) Describe the basic models and taxonomy of Neural networks. 7
2. (a) Define the Crisp sets and Fuzzy sets. Compare them with suitable examples. 8
- (b) Explain classical and fuzzy relations, and their operations. 7

UNIT-II

3. (a) Explain the McCulloch-Pitts neuron model and its limitations. 8

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- (b) What is Hebb's rule? Explain its role in supervised learning networks. 7
4. (a) Describe BPN (Back Propagation Network) and its working principle. 8
- (b) Differentiate between auto-associative and hetero-associative memory networks. 7

UNIT-III

5. (a) Define the Fuzzification and Defuzzification. Describe the methods of Membership value assignment. 8
- (b) What is the Extension principle? How is it used in fuzzy arithmetic? 7
6. (a) Explain the Fuzzy rule base and Fuzzy inference system with an example. 8
- (b) Write short notes on the following : 7
- (i) Fuzzy propositions.
- (ii) Aggregation of fuzzy rules.

UNIT-IV

7. (a) Explain genetic neuro hybrid systems and fuzzy genetic hybrid systems. 8
- (b) What is simplified fuzzy ARTMAP? Describe its significance in pattern classification. 7

8. (a) How can genetic algorithms be applied to solve the traveling salesman problem? 8
- (b) Write a note on Soft computing-based hybrid fuzzy controllers with an application. 7

Roll No.

Total Pages : 3

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48319

MIXED SIGNAL DESIGN

Paper-ECO-16A

Time Allowed : 3 Hours]

[Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. Critically evaluate the use of MOSFET as a switch, emphasizing its speed and precision considerations. 15
2. Define switched capacitor amplifiers and explain the following circuits with suitable diagrams : 15
 - (a) Unity Gain Sampler-Buffer.
 - (b) Switched-Capacitor Integrator.

UNIT-II

3. Characterize a comparator. Analyze the basic CMOS comparator design, highlighting its operation and associated design challenges. 15

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P. T. O.

4. Illustrate the Operation of a charge pump PLL with appropriate diagrams and discuss applications of PLL.

15

UNIT-III

5. (a) Analyze the Resister steering type DAC with mismatch error issues. 10

- (b) Explain Sample and Hold circuit with its characteristics. 5

6. (a) Design a 3-bit DAC using an R-2R architecture with $R = 22K\Omega$, feedback resistance (R_F) = $4K\Omega$, and reference voltage (V_{REF}) = 5V. Assume that the resistances of the switches are negligible. Determine the value of total input current (i_{TOT}) for each digital input and the corresponding output voltage, V_{OUT} . 10

- (b) Discuss the DAC specifications. 5

UNIT-IV

7. (a) Discuss the ADC specifications. 5

- (b) Explain the Design and Operation of a two-step flash ADC. 10

8. Explain any **two** of the followings in details : 15

(a) The Oversampling ADC.

(b) Integrating ADC.

(c) Successive Approximation ADC.