

- N.B. :** (1) Attempt **all** the questions.
(2) **Figures** to the **right** indicate **full** marks.

1. (a) State whether the following statements are **true** or **false** :— 5
- (i) The ideation initiates the process of communication.
 - (ii) Informal channels transmit official news through informal communicative interactions known as the 'grapevine'.
 - (iii) Communication through symbols, charts and graphs is called verbal communication.
 - (iv) Courtesy in letter writing is like lubricant to remove the friction so as to make communication smoother.
 - (v) The design of a resume is only depend on employment needs.
- (b) Fill in the blanks with appropriate words or phrases in the following sentences :— 5
- (i) _____ means that message should be specific instead of general.
 - (ii) _____ are representations of territory and are used for conveying the space relationships between places.
 - (iii) The communication from the higher level in managerial hierarchy to the lower ones is called _____.
 - (iv) _____ notes include key words, headings and subheadings.
 - (v) _____ is the action or reaction of the receiver to the message.

2. (a) What do you understand by verbal communication? Discuss its advantages and disadvantages. 15

OR

- (b) Write short notes on any **three** of the following :—
- (i) Television as a Mode of Communication
 - (ii) Signs and symbols as a Medium of Non Verbal Communication
 - (iii) The Strategies of Effective Communication
 - (iv) Significance of Communication in an Organisation
 - (v) Seven Cs of Communication.

3. (a) What do you understand by Communication Barriers? Discuss the Mechanical and Socio-Psychological Barriers to Communication in detail. 15

OR

- (b) Write short notes on any **three** of the following :—
- (i) Lack of Concentration as a Barrier.
 - (ii) The Ways to Overcome the Language Barriers.
 - (iii) Status Symbol as a Barrier.
 - (iv) Gender Barriers.
 - (v) The Ways to Overcome Environmental Barriers in Communication.

4. (a) Wanted an Assistant Manager for Software Company. Candidate must be good at computer skills and must possess management skills. Preference will be given to candidates with a fluent command over English and some relevant work experience. Write an application along with a bio-data to 'The Personal Manager, Modern India Infotech, D45, MIDC Mahape, Navi Mumbai 400 705'. 15

OR

- (b) Discuss the common formats of the Memorandums and imagine that you are working in reputed company and you notice that one of your subordinates is involved in misconduct while on duty. Draft a memo to be issued to him in one of the formats discussed.

[TURN OVER]

5. (a) Imagine that you are a part of committee of experts that has been formed by the University of Mumbai to investigate the various complaints filed by the individual students, students' union and parents regarding the various malpractices in your college. Draft a report on behalf of the committee. 15

OR

- (b) Imagine that you are working with a reputed company and your company is considering a proposal to establish a new factory in your city. Some of the factors that will influence its decisions are : availability of raw materials, labour, transport facilities, market, competition climate, construction cost and communication facilities. Draft a report with the help of these points with suitable recommendations.
6. (a) Draft a sample Brochure to sale a new Smart Phone having latest android operating system. 15

OR

- (b) What is précis writing ? Read the following passage thoroughly and make a draft of the précis, using only the relevant details :—
Social work is a profession for those with a strong desire to help improve people's lives. Social workers help people function the best way they can in their environment, deal with their relationships, and solve personal and family problems. Social workers often see clients who face a life-threatening disease or a social problem, such as inadequate housing, unemployment, a serious illness, a disability, or substance abuse. Social workers also assist families that have serious domestic conflicts, sometimes involving child or spousal abuse. (Source : CSR Magazine, January, 2015 Issue)

7. (a) Write a summary of the following paragraph and give it a suitable title :— 7
As the General Manager occupied his coveted chair, he witnessed an outrageously turbulent scene in the meeting. The Purchase Officer and Works Manager, at loggerheads with each other right from the word 'go' made the General Manager feel why in the first place had he called both in a meeting considering the fact that there was mutual animosity for each other. Both of the officers breathing fire, it became difficult for each item in the agenda. He tried to intervene but in vain. Both the Purchase Officer and Works Manager were charging in, firing on all cylinders. The General Manager was in utter dismay. Once he even tried to impose his authority by speaking vituperative words but both the officers in dual were least bothered. With every minute passing, the precious time getting lost without much fruitful discussion, the General Manager wondered how to bring these two recalcitrant subordinates under his control. What he lacked most was the authority; he searched for a symbolic gavel that decides the judge's authority in a court. But he was not a judge. He was a managing engineer- an engineer with managerial responsibilities. But as things went on in the meeting, it appeared that his unruly juniors, who were much too overt and trenchant to be tackled, managed him. (215 words).

- (b) Edit the following paragraph to make it readable :— 8
People the world over has been flying kites for centuries in fact, kites were invented over thousands years ago ! One ancient story tells of a chinese general his army was trying to overthrow a cruel emperor. The general made a kite he tied a not in the string Next, his soldiers flew it in the direction of the place when the kite was over the place the general marked the string reeled in the kite the measured the length between the knot and the mark he made on the string. He used this measurement to plan a tunnel to the emperors palace His soldiers spent days digging the tunnel, finally, it was ready His soldiers crept through the tunnel they came out inside the walls of the palace The cruel emperor was defected with the help of a simple kite !

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Con. 375-17. Applied Mathematics - I

(3 Hours)

[Total Marks : 100]

N.B. : (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

1. Attempt any one :—

10

(a) Find the Rank of the Matrix $A = \begin{bmatrix} 3 & 2 & 5 & 7 & 12 \\ 1 & 1 & 2 & 3 & 5 \\ 3 & 3 & 6 & 9 & 15 \end{bmatrix}$ by converting into Normal form.

(b) Derive the formula for n^{th} derivative of $y = \frac{1}{ax+b}$ and hence find n^{th} derivative

$$\text{of } y = \frac{x}{(x-1)(x-2)(x-3)}$$

2. Attempt any three :—

15

(a) Find the rank of the Matrix $\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 3 \\ 0 & -1 & -1 \end{bmatrix}$

(b) Show that the matrix $A = \begin{bmatrix} \frac{1+i}{2} & \frac{-1+i}{2} \\ \frac{1+i}{2} & \frac{1-i}{2} \end{bmatrix}$ is Unitary.

(c) Find the inverse of $A = \begin{bmatrix} 1 & -1 \\ 2 & 3 \end{bmatrix}$ by using Adjoint method.

(d) Solve the following system of equations :—

$$5x + 3y + 7z = 4, \quad 3x + 26y + 2z = 9, \quad 7x + 2y + 10z = 5$$

3. Attempt any three :—

15

(a) Verify Cayley Hamilton theorem for $A = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 0 & -1 \\ 0 & 1 & 2 \end{bmatrix}$

(b) Show that the Vectors $X_1 = (1, 2, 4)$, $X_2 = (2, -1, 3)$ & $X_3 = (0, 1, 2)$ are linearly dependent.

(c) Find the Eigen values of the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 0 & -3 \\ 3 & -3 & 2 \end{bmatrix}$

(d) Is the matrix $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 4 & -6 \\ 3 & -6 & -3 \end{bmatrix}$ diagonalizable. Justify.

[TURN OVER]

4. Attempt any **three** :—

15

- Find unit normal to the Surface $x^2 + y^2 + z^2 = 3$ at $(1, 1, 1)$.
- Show that for any vector field \vec{F} , $\text{div}(\text{curl } \vec{F}) = 0$.
- Find $\text{grad}(f)$ at $(1, 0, 1)$ if $f = x^2y + x y^2 + z$.
- Find $\text{div}(\vec{F})$ at $(1, 2, 3)$ if $\vec{F} = \cos(x)y \mathbf{i} + x y^2 \mathbf{j} + (x + y) \mathbf{k}$.

5. Attempt any **three** :—

15

- Solve $(x + y)^2 \frac{dy}{dx} = a^2$.
- Solve $(x^2 + y^2) dx - 2x^2 dy = 0$.
- Solve $\sin x \frac{dy}{dx} + 2y \cos x = \cos x$.
- Solve $\frac{dy}{dx} - \frac{y}{x} = x^2 y^2$.

6. Attempt any **three** :—

10

- Solve $(D^2 + 3D + 2)y = e^{2x}$.
- Find Particular solution of $(D^2 + D - 6)y = 0$ satisfying the conditions $y(0) = 1$, $y'(0) = 0$.
- Solve $(D^2 + 2D - 3)y = x$.
- Solve $(D^2 + D + 2)y = \sin 3x$.

7. Attempt any **three** :—

15

- Verify Lagrange's mean value theorem for $f(x) = \log x$ in $[1, e]$.
- Verify Rolle's theorem for $f(x) = \sin x$ in $[0, \pi]$.
- Find n^{th} derivative of $y = e^{2x} \cos x$.
- If $u = \log(x^2 + y^2)$, verify $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$.

- N.B. : (1) Question No. 1 is **compulsory**.
(2) **Every** question have an option.
(3) **All** questions carry **equal** marks.

- Q.1 a) Write a short note on RAM & ROM. 5
b) Explain the Basic logic Gates in detail. 5
- Q.2. Write any 3 from the following :-
a) Convert decimal number (123.40) to Binary and Octal. 5
b) Subtract using one's Complement $(2-4)_{10}$. 5
c) Write a short note on error detecting and correcting code. 5
d) $(1001)_2$ into Gray Code and Gray code (1011) into Binary Code. 5
- Q.3. Write any 3 from the following :-
a) State & Prove Demorgan's both laws. 5
b) If the 7-bit Hamming code received by a receiver is 1011011. Assuming Even Parity, State whether the received code is correct or wrong, If wrong, locate & correct the bit in error. 5
c) Why NAND & NOR gate are called as Universal Gates ? 5
d) Minimize the following sop equation using K-map. 5
$$F(A,B,C,D) = \sum M(0,1,2,3,4,5,6,7,8,12)$$
- Q.4. Write any 3 from the following :-
a) Write a short note on 8 to 3 parity encoder. 5
b) Explain Demultiplexer in detail. 5
c) Write a short note on Full Subtractor. 5
d) Explain the term Multiplexer and working of 4:1 multiplexer. 5
- Q.5. Write any 3 from the following :-
a) Explain J-K Flip flop in detail. 5
b) Explain the concept of Synchronous Counter with circuit diagram. 5
c) Design the logic circuit of D Flip Flop. 5
d) What are register? Explain different types of registers. 5
- Q.6. Write any 3 from the following :-
a) Write a short note on Output devices. 5
b) Explain the Basic Organization of computer. 5
c) Explain the concept of Cache Memory in brief. 5
d) Write a short note on Hard Disk. 5
- Q. 7. Write any 3 from the following :-
a) Explain real time operating system with example. 5
b) Compare Windows with Linux. 5
c) Explain the term Single user, Single tasking and Multiuser, Multitasking. 5
d) Explain the use & execution of following Linux commands :- 5
i) cat ii) echo iii) pwd iv) cd v) mkdir

1. (a) Explain the working of a zener diode as a voltage regulator. 5
(b) What is amplitude modulated wave? Obtain the expression for the Instantaneous amplitude of a modulated wave. 5
2. Attempt any **three** question from the following :— 15
 - (a) Explain the input and output characteristics of p-n-p transistor in the Common emitter mode.
 - (b) Draw and explain the forward bias and reverse bias condition of a diode.
 - (c) Explain the working of a transistor as an amplifier.
 - (d) Explain the working of a p-n junction diode as half wave rectifier.
3. Attempt any **three** question from the following :— 15
 - (a) With the help of a neat labelled diagram explain the functioning of a single stage CE amplifier and draw its frequency response.
 - (b) Draw circuit diagram of a RC coupled transistor amplifier and explain its working.
 - (c) What is Darlington pair ? Write one application of Darlington pair.
 - (d) What is Amplification ? Using definitions of AC current gain and DC Current gain obtain equations for A_i , A_o , A_p , Z_i , Z_o .
4. Attempt any **three** question from the following :— 15
 - (a) What do you understand by negative feedback and positive feedback ? Explain the effect of negative feedback on stability, bandwidth, distortion and noise.
 - (b) What are LC oscillators ? Explain Hartley's oscillator.
 - (c) With the help of neat labelled diagram explain the working of RC phase shift scillator.
 - (d) Draw functional block diagram of IC 555 and explain its working.
5. Attempt any **three** question from the following :— 15
 - (a) What is balanced modulator ? Explain its working.
 - (b) Explain independent sideband system.
 - (c) Derive an expression for fraction of total power carried by the sidebands in AM.
 - (d) Explain generation of SSB using filter method.
6. Attempt any **three** question from the following :— 15
 - (a) Explain PRE emphasis and DE emphasis.
 - (b) What is multiplexing ? Explain TDM in detail.
 - (c) Explain PAM and PWM waveform with suitable timing diagrams.
 - (d) Distinguish between AM, FM and PM.
7. Attempt any **three** question from the following :— 15
 - (a) What is the need of digital communication ? Explain PSK in detail.
 - (b) Write a note on lasers.
 - (c) Explain the process of propagation of light in optical fibre.
 - (d) What is optical fibre ? Explain its types.

Con. 378-17. Introduction to C++ programming
(3 Hours)

FU-5829

[Total Marks : 100]

- N.B. : (1) All questions are compulsory (Q. 1 to Q. 7)
(2) Attempt any 3 sub questions out of 4 from Q. 2 to Q. 7.
(3) Draw neat and labelled diagram wherever necessary.

1. (a) What is algorithm ? Write the properties algorithm. 5
(b) Draw a flowchart and write a C++ program to find average of five numbers. 5
2. (a) Define flowchart. Describe the flowchart symbols. 5
(b) What is identifier ? What are the rules for identifier ? 5
(c) Draw a flowchart to find out whether give number is odd and even. 5
(d) What is C++ ? Explain the structure of C++ program. 5
3. (a) Explain input and output statement used in C++. 5
(b) Explain assignment operator with example. 5
(c) Write short note on the escape sequences in C++. 5
(d) What is the use of Comment line in the program ? Explain comment statement used in C++. 5
4. (a) Explain the nested-if-else statement with example. 5
(b) Write a short note on any one looping statements used in C++ program. 5
(c) Write a C++ program to check whether given number is prime. 5
(d) What is Type cast ? Explain Type cast operator with example. 5
5. (a) Explain call by value and call by reference with example. 5
(b) Write a C++ program for factorial of number using recursive function. 5
(c) Explain any five built in function in C++ with example. 5
(d) What is user defined function ? Explain with example. 5
6. (a) Write a C++ program to print the list of students with roll number using array. 5
(b) Write a C++ program to calculate subtraction of given two matrices. 5
(c) Explain pointer in C++ with syntax and example. 5
(d) Define array. Explain multidimensional array with example. 5
7. (a) Write a short note on String function. 5
(b) Write C++ program to accept name and address and phone numbers of employee using structure and print the same. 5
(c) What are strings ? Explain strcmp, strcpy, strlen with example. 5
(d) What is structure ? Explain the syntax of structure with example. 5

(T.D) 28/7

Imo

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