

CODE: 80

Booklet Serial No.

Signature Invigilator

Maulana Azad National Urdu University

B.Tech (Lateral Entry)

Entrance Test – 2026

Question Paper cum Answer Script

Hall Ticket No.

OMR Serial No.

Time: 2hrs

Maximum Marks: 100

INSTRUCTIONS FOR CANDIDATES

1. Candidate should write their Hall Ticket number and OMR serial number on the space provided above. Candidate should not write their Name, Hall Ticket number and OMR Serial Number at any other place.
2. This booklet contains **(44)** pages. Last pages are given for rough work. The Candidate should check the booklet before taking the Test. In case of any discrepancy, a new booklet may be provided by the Invigilator.
3. The question booklet contains 100 Multiple Choice Questions. For each question there are four options, (A), (B), (C), (D). The candidate is required to choose the correct answer and darken the circle with blue / black ballpoint pen in the OMR sheet against the corresponding answer.
4. If the candidate does not bubble the correct answer against the corresponding question number in the OMR sheet, they will not get marks.
5. If the candidate bubbles more than one circle in OMR Sheet for any question, marks shall not be awarded for the question.
6. There are no Negative marks.
7. At the end of Entrance Test, candidates are allowed to take their question booklet.

MATHEMATICS

1. If $A = \begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$ and $n \in N$, then A^{4n} equals

(A) $\begin{bmatrix} i & 0 \\ 0 & i \end{bmatrix}$	(B) $\begin{bmatrix} -i & 0 \\ 0 & -i \end{bmatrix}$
(C) $\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$	(D) $\begin{bmatrix} -1 & 0 \\ 0 & -1 \end{bmatrix}$

2. If $f: \mathbb{R} \rightarrow \mathbb{R}$, then $f(x) = e^x$ is

(A) Continuous everywhere	(B) Continuous nowhere
(C) Continuous at $x=0$ only	(D) None of these

3. If $f: \mathbb{R} \rightarrow \mathbb{R}$, then $f(x) = |x|$ is

(A) Differentiable at $x=0$	(B) Not differentiable at $x=0$
(C) Discontinuous at $x=0$	(D) None of these

4. If $y = a \cos nx - b \sin nx$, then $\frac{d^2 y}{dx^2}$ equals

(A) $n^2 y$	(B) $-n^2 y$
(C) ny	(D) $-ny$

5. The function $f(x) = x^2 - 2x + 1$ is increasing on the interval

(A) $(-\infty, 1)$	(B) $(0, 1)$
(C) $(1, \infty)$	(D) None of these

6. For any two complex numbers z_1 and z_2

(A) $ z_1 z_2 < z_1 z_2 $	(B) $ z_1 z_2 = z_1 z_2 $
(C) $ z_1 z_2 > z_1 z_2 $	(D) None of these

7. For $0 < r \leq n$, ${}^n P_r =$

(A) ${}^n C_r$	(B) ${}^n C_r n!$
(C) ${}^n C_r r!$	(D) ${}^n C_r (n-r)!$

8. Slope of the line passing through the points (3,-2) and (7,-2) is
 (A) 0 (B) 1
 (C) $\frac{1}{4}$ (D) Not defined
9. Equation $x^2 - y^2 = 1$ represents a/an
 (A) Circle (B) Hyperbola
 (C) Ellipse (D) None of these
10. $\lim_{x \rightarrow -1} [1 + x + x^2 + \dots + x^{10}] = \dots\dots\dots$
 (A) 0 (B) 1
 (C) 10 (D) 11
11. $\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin x} = \dots\dots\dots$
 (A) 1 (B) $\frac{1}{2}$
 (C) 2 (D) None of these
12. The value of $\sin^2 15^\circ + \sin^2 75^\circ$ is
 (A) 0 (B) $\frac{1}{2}$
 (C) 1 (D) $\frac{\sqrt{3}}{2}$
13. $\frac{d}{dx}(\sin 2x) = \dots\dots\dots$
 (A) $\sin 2x$ (B) $2 \sin 2x$
 (C) $\cos 2x$ (D) $2 \cos 2x$
14. If $y = \log(\cos x)$, then $\frac{dy}{dx}$ equals
 (A) $\tan x$ (B) $-\tan x$
 (C) $\cot x$ (D) $-\cot x$

15. Equation of a circle with centre (3,-2) and radius 1 is

- (A) $x^2 + y^2 + 6x - 4y + 12 = 0$ (B) $x^2 + y^2 + 6x + 4y + 12 = 0$
 (C) $x^2 + y^2 - 6x + 4y + 12 = 0$ (D) $x^2 + y^2 - 6x - 4y + 12 = 0$

16. General solution of $\frac{dy}{dx} = \frac{1}{x}$ is

- (A) $y = \log|x| + c$ (B) $y = x + c$
 (C) $y = e^x + c$ (D) $y = \frac{1}{x} + c$

17. The sum of first n terms of the geometric series $1 + \frac{2}{3} + \frac{4}{9} + \dots$ is

- (A) $S_n = \left[1 - \left(\frac{2}{3} \right)^n \right]$ (B) $S_n = 2 \left[1 - \left(\frac{2}{3} \right)^n \right]$
 (C) $S_n = 3 \left[1 - \left(\frac{2}{3} \right)^n \right]$ (D) $S_n = 2 \left[1 - \left(\frac{3}{2} \right)^n \right]$

18. $\int \tan x \, dx = \dots\dots\dots$

- (A) $y = \log|\sin x| + c$ (B) $y = -\log|\sin x| + c$
 (C) $y = \log|\cos x| + c$ (D) $y = -\log|\cos x| + c$

19. Area bounded by the curve $y = \cos x$ between $x = 0$ and $x = \frac{\pi}{2}$ is

- (A) 0 (B) 1
 (C) 2 (D) $\frac{\pi}{2}$

20. The unit vector in the direction of the vector $\vec{a} = \hat{i} - 2\hat{j}$ is

- (A) $\hat{a} = \vec{a}$ (B) $\hat{a} = \frac{1}{\sqrt{3}} \vec{a}$
 (C) $\hat{a} = \sqrt{5} \vec{a}$ (D) $\hat{a} = \frac{1}{\sqrt{5}} \vec{a}$

21. If $A = \begin{bmatrix} 5 & x \\ y & 0 \end{bmatrix}$ and $A = A^T$, then
 (A) $x=0, y=5$ (B) $x+y=5$
 (C) $x=y$ (D) None of these
22. If $A = \begin{bmatrix} 1 & \log_b a \\ \log_a b & 1 \end{bmatrix}$, then $|A| =$
 (A) 0 (B) 1
 (C) 2 (D) None of these
23. If $x = a \cos^3 \theta$, $y = a \sin^3 \theta$ then $\frac{dy}{dx}$ equals
 (A) $\tan \theta$ (B) $-\tan \theta$
 (C) $\cot \theta$ (D) $-\cot \theta$
24. If $5x - 3 < 3x + 1$ and x is a real number, then
 (A) $x \in (-\infty, 2)$ (B) $x \in (-\infty, 2]$
 (C) $x \in [2, \infty)$ (D) $x \in (2, \infty)$
25. Which of the following is not a measure of dispersion?
 (A) Range (B) Variance
 (C) Mean (D) Standard Deviation

PHYSICS

26. The SI Unit of Capacitance is
 (A) Ohms (B) Henry
 (C) Farad (D) Tesla
27. If the velocity is 3km/hr, then the same velocity will be _____.
 (A) 8.33m/s (B) 0.833 m/s
 (C) 10.8 m/s (D) 108 m/s
28. The dimensional formula of Momentum is
 (A) $[M L^1 T^{-1}]$ (B) $[M L T^2]$
 (C) $[M L T]$ (D) $[M L^{-1} T^{-2}]$

29. The normal human hearing range is
(A) 20 Hz to 20000 Hz (B) 2 Hz to 20000 Hz
(C) 200 Hz to 20000 HZ (D) 20 Hz to 2000 HZ
30. The condition for Total Internal Reflection is
(A) incident angle = critical angle
(B) incident angle > critical angle
(C) incident angle < critical angle
(D) none of the above
31. If a force of 36N produces an acceleration of 20m/s^2 on a body. Then the mass of the body is
(A) 72 Kg (B) 0.05 Kg
(C) 7.2 Kg (D) 1.8 Kg
32. Which of the following is not a conservative Force?
(A) Gravitational Force (B) Electrostatic Force
(C) Frictional Force (D) Elastic Force
33. Temperature difference is converted to Electric voltage using _____.
(A) electric motor (B) thermometer
(C) transformer (D) thermocouple
34. Volume of a cube of side 1cm is _____.
(A) 10^{-6} m^3 (B) 1 m^3
(C) 10^{-6} cm^3 (D) 10 cm^3
35. The Absolute zero temperature is
(A) -273^0 K (B) 0^0 C
(C) -273^0 C (D) 273^0 C
36. The relation between focal length and radius of curvature of a spherical mirror is
(A) $f = R$ (B) $f = 2R$
(C) $f = R/4$ (D) $f = R/2$

37. The energy consumed by a 50 W bulb running for 6 hours is
(A) 300 KWh (B) 0.3 KWh
(C) 30 KWh (D) 8.33 Wh
38. One electron volt (1 eV) is equal to
(A) 1.6×10^{-19} J (B) 1.6×10^{19} J
(C) 1.6×10^{-19} Kg (D) 1.6×10^{-19} J/kg

CHEMISTRY

39. Which of the following does not have linear shape?
(A) ICl_2^- (B) CH_3^+
(C) XeF_2 (D) ClO^-
40. Most hazardous metal pollutants of automobile exhaust is
(A) Hg (B) Cd
(C) Pb (D) Cu
41. The oxidation number of carbon in $\text{C}_{12}\text{H}_{22}\text{O}_{11}$ is
(A) 0 (B) - 6
(C) + 6 (D) + 2
42. Which among the following is not a state function
(A) Internal energy (B) Free energy
(C) Work (D) Enthalpy
43. Bond energy of a substance
(A) Is always negative
(B) Is always positive
(C) Either positive or negative
(D) Depends upon the physical state of the system
44. Which of the following material is known as lunar caustic?
(A) AgCl (B) AgNO₃
(C) NaOH (D) NaNO₃

45. Which of the following is most acidic?
(A) H_2O (B) H_2S
(C) H_2Se (D) H_2Te
46. What will be the pH of 0.001M $\text{Ba}(\text{OH})_2$ solution
(A) 2.0 (B) 8.4
(C) 11.3 (D) 2.7
47. The IUPAC name of $\text{CH}_3\text{-O-CH}_2\text{CH}_3$
(A) Methyl ethyl ketone (B) Ethyl methyl ether
(C) Methoxyethane (D) Ethoxymethane
48. The hybridization of Br in BrF_5 is
(A) sp^3d^2 (B) sp^3d
(C) sp^2d (D) sp^3
49. The boiling point of water is high due to
(A) High ionic product (B) Hydrogen bonding
(C) Heavy weight (D) High dielectric efficient
50. Which one is Lewis acid
(A) NH_2NH_2 (B) NH_3
(C) AlCl_3 (D) H_2O

COMPUTER SCIENCE

51. Which of the following best explains the role of an Operating System in a computer system?
(A) It translates high-level languages into machine code
(B) It manages hardware resources and provides services to applications
(C) It stores permanent data in secondary storage
(D) It performs arithmetic and logical operations

52. Which of the following is NOT a function of a web browser?
- (A) Rendering HTML content (B) Executing JavaScript
(C) Managing CPU scheduling (D) Handling HTTP requests
53. In computer hardware, which component is primarily responsible for temporary data storage during processing?
- (A) ROM (B) HDD
(C) RAM (D) Cache Memory
54. Which of the following best represents a Cybersecurity threat involving deception to obtain sensitive information?
- (A) Phishing (B) Firewall
(C) Encryption (D) Authentication
55. In office tools like spreadsheets, which feature allows automatic recalculation when data changes?
- (A) Static referencing (B) Dynamic linking
(C) Formula dependency (D) Macro execution
56. The Boolean expression for XOR operation between A and B is?
- (A) $A + B$ (B) $AB + A'B'$
(C) $A'B + AB'$ (D) AB
57. Which of the following number system conversions is correct?
- (A) $(1011)_2 = (13)_{10}$ (B) $(1110)_2 = (12)_{10}$
(C) $(1001)_2 = (8)_{10}$ (D) $(1100)_2 = (10)_{10}$
58. A full adder can be constructed using?
- (A) Two half adders and one OR gate
(B) One half adder and one XOR gate
(C) Two OR gates and one AND gate
(D) Only NAND gates
59. Which flip-flop is free from race-around condition?
- (A) SR Flip-Flop (B) JK Flip-Flop
(C) D Flip-Flop (D) T Flip-Flop

60. The main advantage of Karnaugh Maps (K-Maps) is?
- (A) Faster arithmetic operations
 - (B) Simplification of Boolean expressions
 - (C) Conversion between number systems
 - (D) Increasing memory capacity
61. Which UML diagram is primarily used to represent system functionality from the user's perspective?
- (A) Class Diagram
 - (B) Sequence Diagram
 - (C) Use Case Diagram
 - (D) Activity Diagram
62. In Object-Oriented Design, which principle ensures that data and methods are bundled together?
- (A) Inheritance
 - (B) Encapsulation
 - (C) Polymorphism
 - (D) Abstraction
63. Which UML diagram is best suited for modeling dynamic behavior over time?
- (A) Class Diagram
 - (B) Sequence Diagram
 - (C) Component Diagram
 - (D) Deployment Diagram
64. What will be the output of the following Python code?
- ```
x = "10"
y = 5
print(x * y)
```
- (A) 50
  - (B) 15
  - (C) 1010101010
  - (D) Error
65. Which of the following correctly differentiates between list and tuple in Python?
- (A) Lists are immutable, tuples are mutable
  - (B) Lists are mutable, tuples are immutable
  - (C) Both are immutable
  - (D) Both are mutable



70. Which function is used to change the size of a previously allocated memory block without losing the existing data?

- (A) realloc() (B) calloc()  
(C) malloc() (D) free()

71. What is the output of this recursive function for func(3)?

```
int func(int n)
{
 if (n == 0)
 return 1;
 return n + func(n - 1);
}
```

- (A) 1 (B) 7  
(C) 4 (D) 6

72. Which storage class has a global lifetime but is visible only within the file/function/block it is defined?

- (A) register (B) extern  
(C) auto (D) static

73. What will sizeof return for the following Union on a 32-bit system?

```
union Test {
 int x; // 4 bytes
 char y[10]; // 10 bytes
 float z; // 4 bytes
};
```

- (A) 4 bytes (B) 18 bytes  
(C) 10 bytes (or 12 due to alignment) (D) 8 bytes

74. What will be the output of the following code?

```
#include <stdio.h>
void ET() {
 int x = 2;
 printf("%d", (x << 1) + (x >> 1));
}
int main() {
 ET();
 return 0;}
```

- |       |       |
|-------|-------|
| (A) 1 | (B) 4 |
| (C) 2 | (D) 5 |

75. What does the following print?

```
int main()
{
 int a[] = {1, 2, 3, 4};
 int *p = a;
 printf("%d", *(p + *(p + 1))); return 0;
}
```

- |       |                   |
|-------|-------------------|
| (A) 4 | (B) 1             |
| (C) 3 | (D) Garbage Value |

76. In C, a "Self-Referential Structure" is essential for implementing?

- |                          |                            |
|--------------------------|----------------------------|
| (A) Arrays               | (B) Linked Lists and Trees |
| (C) Basic Math Functions | (D) Macro definitions      |

77. Evaluate the following postfix expression:  $8\ 2\ 3\ ^\wedge\ /\ 5\ 1\ *\ +$  (Note:  $^\wedge$  is exponentiation).

- |       |        |
|-------|--------|
| (A) 9 | (B) 20 |
| (C) 6 | (D) 1  |

78. Which of the following sorting algorithms is not stable in its typical implementation and has a worst-case time complexity of  $O(n^2)$ ?

- |                 |                    |
|-----------------|--------------------|
| (A) Bubble Sort | (B) Merge Sort     |
| (C) Quick Sort  | (D) Insertion Sort |

79. A Binary Search algorithm is being applied to a list. Which of the following is an absolute requirement for the algorithm to work?
- (A) The list must be implemented using a Linked List.
  - (B) The list must have an even number of elements.
  - (C) The list must be sorted.
  - (D) The list must contain only unique values.
80. In a Binary Search Tree (BST), which traversal will always result in a sorted list of the node values?
- (A) Level-order
  - (B) Pre-order
  - (C) Post-order
  - (D) In-order
81. Which data structure is used to implement Breadth-First Search (BFS) on a graph, and which is used for Depth-First Search (DFS)?
- (A) BFS: Stack; DFS: Queue
  - (B) BFS: Priority Queue; DFS: Stack
  - (C) BFS: Array; DFS: Linked List
  - (D) BFS: Queue; DFS: Stack
82. In a simple undirected graph with  $V$  vertices, what is the maximum number of edges possible?
- (A)  $V(V-1) / 2$
  - (B)  $V^2$
  - (C)  $V(V-1)$
  - (D)  $2V - 1$
83. What is the maximum number of nodes in a Binary Tree of height  $K$ ? (Assume the root is at height 1). (Note:  $^$  is exponentiation)
- (A)  $2^K$
  - (B)  $2^K - 1$
  - (C)  $2^{\{K-1\}}$
  - (D)  $2K + 1$
84. What is the maximum number of nodes in a Binary Tree of height  $K$ ? (Assume the root is at height 1). (Note:  $^$  is exponentiation)
- (A) Internal Level
  - (B) Conceptual Level
  - (C) External Level
  - (D) Logical Level

85. A banking transaction is designed to ensure that if two people try to withdraw money from the same account at the exact same microsecond, the system processes them one after another so the balance remains correct. Which ACID property is primarily responsible for this?
- (A) Atomicity (B) Consistency  
(C) Isolation (D) Durability
86. In a table with a composite primary key (Student\_ID, Course\_ID), there is an attribute called 'Course\_Name'. Since 'Course\_Name' depends only on 'Course\_ID' and not the full primary key, what normalization rule is being violated?
- (A) First Normal Form (1NF) (B) Third Normal Form (3NF)  
(C) Second Normal Form (2NF) (D) BCNF
87. In Relational Algebra, which operator is used to filter out rows (tuples) that do not meet a specific condition? (Equivalent to the WHERE clause in SQL).
- (A) Projection ( $\Pi$ ) (B) Selection ( $\sigma$ )  
(C) Join ( $\bowtie$ ) (D) Cartesian Product ( $\times$ )
88. A user notices their computer is taking a long time to open files and folders on a traditional Hard Disk Drive (HDD). Which utility should be used to reorganize the data on the disk into contiguous sectors to improve performance?
- (A) CHKDSK (Check Disk) (B) BIOS Setup  
(C) Disk Cleaner (D) Disk Defragmenter
89. In the OSI Reference Model, which layer is responsible for determining the best physical path for data to travel (Routing) and uses logical addresses like IP Addresses?
- (A) Network Layer (B) Transport Layer  
(C) Data Link Layer (D) Physical Layer
90. Which networking device operates at the Data Link Layer (Layer 2) and is "smarter" than a hub because it records MAC addresses to send data only to the specific intended port?
- (A) Repeater (B) Network Switch  
(C) Router (D) Modem

91. Which type of memory is volatile, allows the CPU to read and write data quickly, and is plugged into slots like DIMM or SIMM on the motherboard?
- (A) ROM (B) CMOS  
(C) RAM (D) EPROM
92. In the 8086 microprocessor, which register is specifically designed to serve as a default counter for loop operations (LOOP instruction) and string manipulation?
- (A) CX (Count Register) (B) BX (Base Register)  
(C) AX (Accumulator) (D) DX (Data Register)
93. Which status flag in the 8086 microprocessor is set to 1 if the result of an arithmetic or logical operation is zero, often used for conditional branching (e.g., JZ or JNZ)?
- (A) Zero Flag (ZF) (B) Carry Flag (CF)  
(C) Sign Flag (SF) (D) Auxiliary Carry Flag (AF)
94. The 8255 PPI chip is commonly used to interface the 8086 with external devices. In which mode of operation does Port A or Port B function with “Handshaking” signals to synchronize data transfer?
- (A) Mode 0 (Simple I/O) (B) Mode 2 (Bi-directional Bus)  
(C) Mode 1 (Strobed I/O) (D) Bit Set/Reset (BSR) Mode
95. Which SDLC model is characterized by an iterative approach where each loop represents a phase of the process, heavily focusing on Risk Analysis at every stage?
- (A) Spiral Model  
(B) Iterative Waterfall Model  
(C) RAD (Rapid Application Development)  
(D) Model Classical Waterfall Model
96. During the testing phase, which type of testing is performed to ensure that different modules or units of the software work together correctly as a combined group?
- (A) Unit Testing (B) System Testing  
(C) Integration Testing (D) Acceptance Testing

97. A software team receives a request to add a new "Dark Mode" feature to an existing application that is already in use by customers. Which category of software maintenance does this fall under?
- (A) Corrective Maintenance                      (B) Adaptive Maintenance  
(C) Perfective Maintenance                      (D) Preventive Maintenance
98. In which IoT communication model does the device send data to a cloud-based service directly without the use of an intermediate gateway, typically using protocols like HTTP or MQTT?
- (A) Device-to-Device (D2D)                      (B) Device-to-Gateway  
(C) Back-End Data-Sharing                      (D) Device-to-Cloud (D2C)
99. When interfacing sensors with a Raspberry Pi, which synchronous, full-duplex communication interface uses a Master-Slave architecture with four wires (SCLK, MOSI, MISO, SS)?
- (A) I2C (Inter-Integrated Circuit)  
(B) SPI (Serial Peripheral Interface)  
(C) UART (Universal Asynchronous Receiver-Transmitter)  
(D) USB (Universal Serial Bus)
100. While M2M (Machine-to-Machine) and IoT are related, which of the following is a distinguishing characteristic of IoT compared to traditional M2M?
- (A) M2M relies primarily on proprietary non-IP networks, while IoT emphasizes integration with global IP-based networks.  
(B) M2M uses cloud computing, whereas IoT only uses local servers.  
(C) IoT is only for industrial use, whereas M2M is for consumer use.  
(D) M2M supports millions of devices, while IoT is limited to small clusters.

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**Rough Work**

**Rough Work**

**Rough Work**