D 144453 (Pages : 16) Name.....

Reg. No.....

CALICUT UNIVERSITY COMMON ENTRANCE TEST (CU-CET), APRIL 2026

MASTER OF COMPUTER APPLICATION (MCA)

Time : Two Hours Maximum : 400 Marks

Each question carries 4 marks.

One mark will be deducted for each wrong answer.

1. Which data structure operates on the LIFO (Last In First Out) principle ?

   (A) Queue. (B) Stack.

   (C) Linked List. (D) Tree.

2. What is the worst case time complexity of Binary Search on a sorted array of n elements ?

   (A) O (1). (B) O (n).

   (C) O (log n). (D) O (n^2)

3. Which SQL clause is used to filter records based on a condition applied to groups ?

   (A) WHERE. (B) HAVING.

   (C) GROUP BY. (D) ORDER BY.

4. What is the output of the following Java code ?

```
public class Test {
    public static void main(String[] args) {
        int x = 10;
        int y = x—;
        System.out.println(x + "" + y);
    }
}
```

   (A) 9 10. (B) 10 10.

   (C) 9 9. (D) 10 9.

5. Which of the following is NOT a feature of Object-Oriented Programming ?

(A) Encapsulation.

(B) Polymorphism.

(C) Compilation.

(D) Inheritance.

6. In C++, which operator is used to dynamically allocate memory ?

(A) malloc.

(B) new.

(C) alloc.

(D) create.

7. Which normal form eliminates partial functional dependencies ?

(A) 1NF.

(B) 2NF.

(C) 3NF.

(D) BCNF.

8. A binary tree with n internal nodes (where every internal node has exactly 2 children) has how many leaf nodes ?

(A) n.

(B) $n + 1$.

(C) $n - 1$.

(D) $2n$.

9. Which CPU scheduling algorithm gives minimum average waiting time for a given set of processes ?

(A) FCFS.

(B) Round Robin.

(C) SJF.

(D) Priority Scheduling.

10. What does DNS stand for in networking ?

(A) Data Network System.

(B) Domain Name System.

(C) . Digital Network Service.

(D) Data Name Server.

11. What is the output of the following C code?

```
#include <stdio.h>
#include <string.h>
int main() {
    char str[] = "HELLO";
    printf("%d", strlen(str));
    return 0;
}
```

(A) 4. (B) 5.

(C) 6. (D) 0.

12. Which layer of the OSI model is responsible for routing packets across networks ?

(A) Data Link. (B) Transport.

(C) Network. (D) Session.

13. Which tree traversal visits the root node last ?

(A) Inorder. (B) Preorder.

(C) Postorder. (D) Level Order.

14. Which of the following is NOT an operating system ?

(A) Linux. (B) Oracle.

(C) Windows. (D) macOS.

15. The average case time complexity of Quick Sort is :

(A) O (n). (B) O ($n \log n$).

(C) O (n^2). (D) O ($\log n$).

16. Which keyword in Java is used to prevent a method from being overridden in a subclass ?

(A) static. (B) private.

(C) abstract. (D) final.

17. Which protocol is used to assign IP addresses dynamically to devices in a network ?

(A) FTP. (C) HTTP.

(B) DHCP. (D) SMTP.

18. What is the output of the following C++ code ?

```
#include <iostream>
using namespace std;
int main() {
    int arr[] = {10, 20, 30,40, 50};
    cout « *(arr + 2);
    return 0;
}
```

(A) 10. (C) 30.

(B) 20. (D) 40.

19. Which of the following is a non-linear data structure ?

(A) Array. (C) Stack.

(B) Queue. (D) Tree.

20. Which of the following is used to detect deadlock in an operating system ?

(A) Resource Allocation Graph.

(B) Page Table.

(C) Symbol Table.

(D) Translation Lookaside Buffer.

21. Which protocol is used for secure web communication ?

(A) HTTP. (B) FTP.

(C) HTTPS. (D) SMTP.

22. In Java, which is the parent class of all classes ?

(A) Base. (B) Super.

(C) Object. (D) Main.

23. Which of the following sorting algorithms is stable ?

(A) Quick Sort. (B) Heap Sort.

(C) Merge Sort. (D) Selection Sort.

24. In a max-heap, the root node always contains :

(A) The smallest element. (B) The largest element.

(C) A random element. (D) The median element.

25. In C, what is the effect of declaring a variable as 'static' inside a function ?

(A) It makes the variable globally accessible.

(B) It preserves the variable's value between function calls.

(C) It deletes the variable after each call.

(D) It makes the variable a constant.

26. Which of the following is NOT a valid access modifier in Java ?

(A) public. (B) protected.

(C) internal. (D) private.

27. What is the output of the following Java snippet ?

```
int a = 5, b = 3;
System.out.println(a & b);
```

(A) 1. (B) 7.

(C) 15. (D) 2.

28. Which of the following is an example of a greedy algorithm ?

(A) Merge Sort. (B) Dijkstra's Shortest Path.

(C) Binary Search. (D) Tower of Hanoi.

29. In which type of memory management is a program divided into equal-sized blocks ?

(A) Segmentation. (B) Paging.

(C) Swapping. (D) Partitioning.

30. Which of the following is the correct way to declare a constant in C++ ?

(A) #define const PI 3.14. (B) constant int PI = 3.14

(C) const int PI = 3. (D) int const = 3.14.

31. The derivative of $\tan^{-1}(x)$ with respect to x is :

(A) $1/(1 + x^2)$ (B) $-1/(1 + x^2)$.

(C) $1/(1 - x^2)$ (D) $x/(1 + x^2)$.

32. $\int e^x (\sin x + \cos x)\, dx$ is :

(A) $e^x \sin x + C$. (B) $e^x \cos x + C$.

(C) $e^x (\sin x - \cos x) + C$. (D) $e^x \tan x + C$.

33. The value of $\lim (x \to 0) (\sin 3x) / x$ is :

(A) 1. (B) 3.

(C) 0. D) ∞.

34. If A = [[1, 2], [3, 4]], then det (A) is :

(A) – 2. (B) 2

(C) 10. (D) – 10.

35. The distance between the points (3, 4) and (0, 0) is :

(A) 4. (B) 3.

(C) 5. (D) 7.

36. The sum of an infinite geometric series with first term 2 and common ratio 1/3 is :

(A) 3. (B) 6.

(C) 2/3. (D) 9.

37. If $\log 8 = x$, then x equals :

(A) 2. (B) 3.

(C) 4. (D) 1.

38. The number of ways to arrange all 5 letters of the word MANGO is :

(A) 60. (B) 120.

(C) 24. (D) 20.

39. The equation of the circle with centre (2, – 3) and radius 5 is :

(A) $(x-2)^2 + (y+3)^2 = 25$. (B) $(x+2)^2 + (y-3)^2 = 25$.

(C) $(x-2)^2 + (y-3)^2 = 5$. (D) $(x+2)^2 + (y+3)^2 = 25$.

40. If $\sin\theta = 3/5$, then $\cos\theta$ is :

(A) 4/5. (B) 3/4.

(C) 5/4. (D) 5/3.

41. The value of $\int_0^{\pi} \sin x \, dx$ is :

(A) 0. (B) 1.

(C) 2. (D) π.

42. The roots of $x^2 - 7x + 12 = 0$ are :

(A) 3 and 4. (B) 2 and 6.

(C) 1 and 12. (D) – 3 and – 4.

43. The slope of the line $3x - 4y + 7 = 0$ is :

(A) 3/4. (B) – 3/4.

(C) 4/3. (D) – 4/3.

44. If A is a 3 × 3 matrix and $|A| = 4$, then $|2A|$ is :

(A) 8. (B) 16.

(C) 32. (D) 64.

45. The n^{th} term of the AP : 5, 8, 11, 14, ... is :

(A) $3n + 2$. (B) $5n$.

(C) $2n + 3$. (D) $3n + 1$.

46. The value of cos 60° × sin 30° is :

(A) 1/4. (B) 1/2.

(C) 1. (D) 0.

47. The area of a triangle with vertices (0, 0), (4, 0), (0, 3) is :

(A) 12. (B) 7.

(C) 6. (D) 10.

48. $\int x^3 \, dx$ is :

(A) $3x^2 + C$. (B) $x/4 + C$.

(C) $x^2/2 + C$. (D) $4x + C$.

49. If A = [[2, 0], [0, 3]], then A^2 is :

(A) [[4. 0], [0, 9]]. (B) [[4, 0], [0, 6]].

(C) [[4, 0], [0, 3]]. (D) [[2, 0], [0, 9]].

58. The value of $\int^{2}(2x+1)dx$ is :

(A) 4. (B) 5.

(C) 6. (D) 7.

59. If the AM of two numbers is 10 and their GM is 8, the two numbers are:

(A) 4 and 16. (B) 6 and 14.

(C) 2 and 18. (D) 5 and 15.

60. The value of $\tan(\pi/4) + \cot(\pi/4)$ is :

(A) 0. (B) 1.

(C) 2. (D) $\sqrt{2}$.

61. The arithmetic mean of 3, 6, 9, 12, 15 is :

(A) 9. (B) 8.

(C) 10. (D) 7.

62. If two events A and B are mutually exclusive, then $P(A \cup B)$ is :

(A) $P(A) \times P(B)$. (B) $P(A) + P(B) - P(A \cap B)$.

(C) $P(A) + P(B)$. (D) $P(A) - P(B)$.

63. The standard deviation of 5, 5, 5, 5, 5 is :

(A) 5 (B) 1.

(C) 25. (D) 0.

64. In a Poisson distribution, the mean is equal to :

(A) np. (B) npq.

(C) λ. (D) n/p.

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65. The median of the data set 7, 3, 1, 9, 5 is :

(A) 5. (B) 7.

(C) 3. (D) 9.

66. The co-efficient of variation is defined as :

(A) (Mean / SD) × 100. (B) (SD / Mean) × 100.

(C) SD × Mean. (D) Mean - SD

67. In a binomial distribution, the mean is 6 and variance is 4. The value of n is :

(A) 10. (C) 18.

(B) 15. (D) 12.

68. For a perfectly symmetrical distribution, the relationship between mean, median, and mode is :

(A) Mean > Median > Mode. (B) Mean < Median < Mode.

(C) Mean = Median = Mode. (D) Mode > Mean > Median.

69. The probability of getting a head in a single toss of a fair coin is :

(A) 0. (B) 1.

(C) 1/2. (D) 1/4.

70. The range of the data 12, 7, 19, 3, 25, 10 is :

(A) 19. (B) 22.

(C) 25. (D) 15.

71. The SI unit of electric charge is :

(A) Ampere. (B) Coulomb.

(C) Volt. (D) Ohm.

72. Which law states that the pressure of a gas is inversely proportional to its volume at constant temperature ?

(A) Charles' Law. (B) Avogadro's Law.

(C) Boyle's Law. (D) Gay-Lussac's Law.

73. The speed of light in vacuum is approximately :

(A) 3×10 m/s. (B) 3×10 m/s.

(C) 3×10^1 m/s. (D) 3×10^{12} m/s.

74. Which of the following is a scalar quantity ?

(A) Force. (B) Velocity.

(C) Displacement. (D) Temperature.

75. The bending of light around the edges of an obstacle is called :

(A) Refraction. (B) Reflection.

(C) Diffraction. (D) Polarization.

76. Ohm's Law states that current flowing through a conductor is :

(A) Directly proportional to resistance.

(B) Inversely proportional to voltage.

(C) Directly proportional to voltage.

(D) Independent of voltage.

77. The SI unit of frequency is :

(A) Second. (B) Hertz.

(C) Newton. (D) Pascal.

78. Which of the following has the highest energy in the electromagnetic spectrum ?

(A) Radio waves. (B) Infrared rays.

(C) Visible light. (D) Gamma rays.

79. A body moving with uniform velocity has an acceleration equal to :

(A) 1 m/s^2. (B) 9.8 m/s^2.

(C) Infinity. (D) Zero.

80. The photoelectric effect demonstrates that light behaves as :

(A) A wave.
(B) A particle.
(C) Both wave and particle.
(D) Neither wave nor particle

81. The atomic number of Carbon is :

(A) 6.
(C) 12.
(B) 8.
(D) 14.

82. Which gas is commonly used in fire extinguishers ?

(A) Oxygen.
(C) Carbon Dioxide.
(B) Nitrogen.
(D) Hydrogen.

83. The pH of pure water at 25°C is:

(A) 0.
(C) 14.
(B) 7.
(D) 5.

84. Which of the following is a noble gas ?

(A) Nitrogen.
(B) Oxygen.
(C) Argon.
(D) Chlorine.

85. The chemical formula of common table salt is :

(A) KCI.
(B) CaCO.
(C) NaCI.
(D) MgSO.

86. Which substance is most commonly used in the manufacture of fertilizers ?

(A) Sulfuric acid.
(C) Ammonia.
(B) Nitric acid.
(D) Hydrochloric acid.

87. Rusting of iron is a process of :

(A) Reduction.
(B) Oxidation.
(C) Sublimation.
(D) Distillation.

88. The valency of oxygen is :

(A) 1.
(B) 2.
(C) 3.
(D) 4.

89. Which of the following is a polymer ?

(A) Glucose.
(B) Nylon.
(C) Ethanol.
(D) Salt.

90. The process of converting a liquid into vapour by heating is called :

(A) Condensation.
(B) Sublimation.
(C) Evaporation.
(D) Solidification.

91. If CAT is coded as 3120 and DOG is coded as 4157, then RAT is coded as :

(A) 18120.
(B) 18201.
(C) 18210.
(D) 12018.

92. Find the next term in the series : 2, 5, 10, 17, 26, ?

(A) 35.
(C) 39.
(B) 37.
(D) 41.

93. If the day before yesterday was Saturday, what day will tomorrow be ?

(A) Tuesday.
(B) Wednesday.
(C) Thursday.
(D) Friday.

94. A man walks 10 km. east, then 5 km. north, then 10 km. west. How far is he from the starting point ?

(A) 10 km. (B) 5 km.

(C) 15 km. (D) 25 km.

95. Find the odd one out : Mango, Apple, Banana, Potato, Grapes.

(A) Mango. (B) Apple.

(C) Potato. (D) Grapes.

96. If BOOK is coded as CPPL, then DOOR is coded as :

(A) EPPQ. (B) EPPS.

(C) EPPR. (D) EPOS.

97. Statements : All cats are dogs. Some dogs are birds.

Conclusion I : Some cats are birds.

Conclusion II : Some birds are cats.

(A) Only Conclusion I follows.

(B) Only Conclusion II follows.

(C) Both Conclusion I and II follow.

(D) Neither Conclusion I nor II follows.

98. A is the brother of B. B is the sister of C. C is the son of D. How is A related to D ?

(A) Son. (B) Daughter.

(C) Brother. (D) Cannot be determined.

99. Pen : Write :: Knife : ?

(A) Cut.

(B) Sharpen.

(C) Metal.

(D) Cook.

100. A is twice as old as B was when A was as old as B is now. If A is 36 years old now, what is B's current age ?

(A) 18.

(C) 27.

(B) 24.

(D) 30.

D 123839 (Pages : 16) Name.....

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APRIL 2025

MASTER OF COMPUTER APPLICATION (MCA)

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1. Which of the following computer networks is built on the top of another network ?

   (a) Overlay network. (b) Prime network.

   (c) Prior network. (d) Chief network.

2. When a collection of various computers appears as a single coherent system to its clients, what is this called ?

   (a) Mail system. (b) Networking system.

   (c) computer network. (d) distributed system.

3. What are nodes in a computer network ?

   (a) The computer that routes the data.

   (b) The computer that terminates the data.

   (c) The computer that originates the data.

   (d) All of the mentioned.

4. Which one of the following is not a function of network layer ?

   (a) Congestion control. (b) Error control.

   (c) Routing. (d) Inter-networking.

5. What is the term for an endpoint of an inter-process communication flow across a computer network ?

   (a) Port. (b) Machine.

   (c) Socket. (d) Pipe.

6. Which of the following is false in the case of a spanning tree of a graph G ?

   (a) It is tree that spans G.

   (b) It is a subgraph of the G.

   (c) It includes every vertex of the G.

   (d) It can be either cyclic or acyclic.

7. Consider a undirected graph G with vertices {A, B, C, D, E}. In graph G, every edge has distinct weight. Edge CD is edge with minimum weight and edge AB is edge with maximum weight. Then, which of the following is false ?

   (a) Every minimum spanning tree of G must contain CD.

   (b) If AB is in a minimum spanning tree, then its removal must disconnect G.

   (c) No minimum spanning tree contains AB.

   (d) G has a unique minimum spanning tree.

8. What is the worst case time complexity of the Quick sort ?

   (a) O ($n$log$n$). (b) O (n).

   (c) O(n^3). (d) O (n^2).

9. Which of the following sorting algorithm is best suited if the elements are already sorted ?

   (a) Heap Sort. (b) Quick Sort.

   (c) Insertion Sort. (d) Merge Sort.

10. What will be the best case time complexity of merge sort ?

    (a) O ($n$log$n$). (b) O (n^2).

    (c) O (n^2 log n). (d) O (n log n^2).

11. To access the services of the operating system, the interface is provided by the _____.

    (a) Library. (b) System calls.

    (c) Assembly instructions. (d) API.

12. Which one of the following is not true ?

(a) Kernel remains in the memory during the entire computer session.

(b) Kernel is made of various modules which can not be loaded in running operating system.

(c) Kernel is the first part of the operating system to load into memory during booting.

(d) Kernel is the program that constitutes the central core of the operating system.

13. Which one of the following errors will be handle by the operating system ?

(a) Lack of paper in printer.

(b) Connection failure in the network.

(c) Power failure.

(d) All of the mentioned.

14. If a process fails, most operating system write the error information to a _____.

(a) New file. (b) Another running process.

(c) Log file. (d) None of the mentioned.

15. Which one of the following is not a real time operating system?

(a) RTLinux. (b) Palm OS.

(c) QNX. (d) Vx Works

16. Cascading termination refers to the termination of all child processes if the parent process terminates _____.

(a) Normally or abnormally. (b) Abnormally.

(c) Normally. (d) None of the mentioned.

17. Transient operating system code is a code that _____.

(a) Stays in the memory always.

(b) Never enters the memory space.

(c) Comes and goes as needed.

(d) Is not easily accessible.

18. What will happen in the single level directory ?

(a) All files are contained in the same directory.

(b) All files are contained in different directories all at the same level.

(c) Depends on the operating system.

(d) None of the mentioned.

19. On systems where there are multiple operating system, the decision to load a particular one is done by ————.

(a) Process control block.

(b) File control block.

(c) Boot loader.

(d) Bootstrap.

20. Which of the following is known as a set of entities of the same type that share same properties, or attributes ?

(a) Relation set.

(b) Tuples.

(c) Entity set.

(d) Entity Relation model.

21. ———— operations do not preserve non-matched tuples.

(a) Left outer join.

(b) Inner join.

(c) Natural join.

(d) Right outer join.

22. The user IDs can be added or removed using which of the following fixed roles ?

(a) db_sysadmin.

(b) db_accessadmin.

(c) db_securityadmin.

(d) db_setupadmin.

23. After groups have been established, SQL applies predicates in the ———— clause, allowing aggregate functions to be used.

(a) Where.

(b) Having.

(c) Group by.

(d) With.

24. ———— is a software development activity that is not a part of software processes.

(a) Validation.

(b) Specification.

(c) Development.

(d) Dependence.

25. The activity that distributes estimated effort across the planned project duration by allocating the effort to specific software developing tasks is ————.

(a) Project scheduling. (b) Detailed schedule.

(c) Macroscopic schedule. (d) None of the mentioned.

26. The Cleanroom philosophy was proposed by ————.

(a) Linger. (b) Mills.

(c) Dyer. (d) All of the Mentioned.

27. What is the use of a symbol table in compiler design ?

(a) Finding name's scope.

(b) Type checking.

(c) Keeping all of the names of all entities in one place.

(d) All of the mentioned.

28. A programmer, writes a program to multiply two numbers instead of dividing them by mistake, how can this error be detected ?

(a) Compiler or interpreter. (b) Compiler only.

(c) Interpreter only. (d) None of the mentioned.

29. Which of the following is a system program that integrates a program's individually compiled modules into a form that can be executed ?

(a) Interpreter. (b) Assembler.

(c) Compiler. (d) Linking Loader.

30. Which of the following is a Computer Graphics type ?

(a) Raster and Vector. (b) Raster and Scalar.

(c) Scalar only. (d) All of the above.

31. If the initial side is overlapping on the terminal side, then angle is ————.

(a) 0°. (b) 180°.

(c) 90°. (d) 270°

32. 1 degree is ———— radian.

(a) π. (b) 0.046.

(c) 0.1746. (d) 0.01746.

33. Which among these are complementary angles ?

(a) $\angle A + \angle B = 90°$. (b) $\angle A + \angle B = 180°$.

(c) $\angle A + \angle B = 60°$. (d) $\angle A + \angle B = 45°$.

34. What is the value of tan 48° ?

(a) Cot 42°. (b) Tan 42°.

(c) Tan 16°. (d) Cot 16°.

35. The region between an arc and the two radii, joining the centre to the end points of the arc is called ————.

(a) arc. (b) chord.

(c) sector. (d) area of circle.

36. When does both segments and both sectors become equal ?

(a) When two arcs are equal.

(b) When radius = 2* chord.

(c) When two arcs are unequal.

(d) When chord = radius.

37. Find the incorrect option (Assume conventional notations).

(a) $Q = p/q$ where p and q are integers and $q = 0$.

(b) N = {1, 2, 3...}.

(c) W = {0, 1, 2, 3...}.

(d) Z = {...– 2, – 1, 0, 1, 2...}.

38. How many solutions does a linear equation have ?

(a) One. (b) Two.

(c) Three. (d) Four.

39. Find the solution for the linear equation $2.5x = 5$?

(a) $x = -2$. (b) $x = 5$.

(c) $x = 3$. (d) $x = 2$.

40. What are the number of solutions of set of linear equations $x + 2y = 6$ and $3x + 6y = 16$?

(a) One. (b) Two.

(c) Zero. (d) Infinite.

41. A curve passes through (1, 1) such that the triangle formed by the co-ordinate axes and the tangent at any point of the curve is in the first quadrant and has its area equal to 2. What is the differential equation ?

(a) $dy/dx = [(xy + 2) \pm \sqrt{(1 + xy)}]/ x^2$.

(b) $dy/dx = [(xy - 2) \pm \sqrt{(1 + xy)}]/ x^2$.

(c) $dy/dx = [(xy - 2) \pm \sqrt{(1 - xy)}]/ x^2$.

(d) $dy/dx = [(xy + 2) \pm \sqrt{(1 - xy)}]/ x^2$.

42. What will be the value of $dy/dx - a/x * y = (x + 1)/x$?

(a) $y = x/(1 - a) - 1/a + cx^a$.

(b) $y = x/(1 + a) + 1/a + cx^a$.

(c) $y = x/(1 - a) - 1/a - cx^a$.

(d) $y = x/(1 + a) - 1/a + cx^a$.

43. What will be the differential equation form of $\sqrt{(a^2 + x^2)}dy/dx + y = \sqrt{(a^2 + x^2)} - x$?

(a) $a^2 \log (x + \sqrt{(a^2 - x^2)}) + c$.

(b) $a^2 \log (x + \sqrt{(a_2 + x^2)}) + c$.

(c) $a^2 \log (x - \sqrt{(a^2 + x^2)}) + c$.

(d) $a^2 \log (x - \sqrt{(a^2 - x^2)}) + c$.

Turn over

44. What is the differential equation of all parabolas whose directrices are parallel to the x-axis ?

(a) $d^3x/dy^3 = 0$.
(b) $d^3y/(dx^3 + d^2y/dx^2) = 0$.
(c) $d^3y/dx^3 = 0$.
(d) $d^2y/dx^2 = 0$.

45. What will be the general solution of the differential equation $d^2y/dx^2 = e^{2x}(12 \cos 3x - 5 \sin 3x)$? (here, A and B are integration constant)

(a) $y = e^x \sin 3x + Ax + B$.
(b) $y = e^{2x} \sin 3x + Ax + B$.
(c) $y = e^{2x} \sin 3x + A$.
(d) Data inadequate.

46. What is the solution of the given equation $(D + 1)^2y = 0$ given $y = 2 \log_e 2$ when $x = \log_e 2$ and $y = (4/3) \log_e 3$ when $x = \log_e 3$?

(a) $y = 4xe^{-x}$.
(b) $y = 4xe^x$.
(c) $y = -4xe^{-x}$.
(d) $y = -4xe^x$.

47. Which of the following is the valid differential equation $x = a \cos(\alpha t + \beta)$?

(a) $d^2x/dt^2 - \alpha x = 0$.
(b) $d^2x/dt^2 + \alpha x = 0$.
(c) $d^2x/dt^2 - \alpha^2 x = 0$.
(d) $d^2x/dt^2 + \alpha^2 x = 0$.

48. If the order of the matrix is $m \times n$, then how many elements will there be in the matrix ?

(a) mn.
(b) $m^2 n^2$.
(c) mn^2.
(d) $2mn$.

49. Which of the following condition is incorrect for matrix multiplication ?

(a) A (BC) = (AB)C.
(b) A (B + C) = AB + AC.
(c) AB = 0 if either A *or* B is 0.
(d) AB = BA.

50. The matrix which follows the conditions $m = n$ is called ?

(a) Square matrix.
(b) Rectangular matrix.
(c) Scalar matrix.
(d) Diagonal matrix.

51. The matrix which follows the condition $m > n$ is called as ————.

(a) Vertical matrix.
(b) Horizontal matrix.
(c) Diagonal matrix.
(d) Square matrix.

52. What is the area of the triangle if the vertices are (0, 2), (0, 0), (3, 0) ?

(a) 1 sq.unit. (b) 5 sq.units.

(c) 2 sq.units. (d) 3 sq.units.

53. Which of the following is not the property of transpose of a matrix ?

(a) (A')' = A. (b) (A + B)' = A'+B'.

(c) (AB)' = (BA)'. (d) (kA)' = KA'.

54. What are the kinds of discontinuity ?

(a) Minor and major kinds.

(b) Increment and decrement kinds.

(c) First and second kinds.

(d) Zero and one kinds.

55. What is/are conditions for a function to be continuous on (a, b) ?

(a) The function is continuous at each point of (a, b).

(b) The function is right continuous

(c) The function is left continuous.

(d) Right continuous, left continuous, continuous at each point of (a, b).

56. Function f should be ———— on $[a, b]$ according to Rolle's theorem.

(a) Continuous. (b) Non-continuous.

(c) Integral. (d) Non-existent.

57. What are/is the conditions to satify Lagrange's mean value theorem ?

(a) f is continuous on $[a, b]$

(b) f is differentiable on (a, b)

(c) f is differentiable and continuous on (a, b).

(d) f is differentiable and non-continuous on (a, b).

58. Differentiate $8e^{-x} + 2e^{x}$ w.r.t x.

(a) $2e^{-x} + 8e^{x}$.

(b) $2e^{x} + 8e^{-x}$.

(c) $2e^{-x} - 8e^{x}$.

(d) $2e^{x} - 8e^{-x}$.

59. If E and F are two events associated with the same sample space of a random experiment then P (E | F) is given by ————.

(a) $P(E \cap F) / P(F)$, provided $P(F) \neq 0$.

(b) $P(E \cap F) / P(F)$, provided $P(F) = 0$.

(c) $P(E \cap F) / P(F)$.

(d) $P(E \cap F) / P(E)$.

60. Given that E and F are events such that P (E) = 0.6, P (F) = 0.3 and $P(E \cap F) = 0.2$, then P (E | F) ?

(a) 1/3.

(b) 2/3.

(c) 3/4.

(d) 1/4.

61. What is the measure of central tendency that is most affected by outliers ?

(a) Mean.

(b) Median.

(c) Mode.

(d) Range.

62. A factory produces pens, and the probability of a pen being defective is 0.03. If a customer buys 20 pens, what is the probability that none of them are defective ? Assume the pens are independent.

(a) 0.742.

(b) 0.658.

(c) 0.857.

(d) 0.635.

63. What is the formula for the co-efficient of variation ?

(a) (Standard Deviation / Mean) * 100.

(b) (Mean / Standard Deviation) * 100.

(c) (Variance / Mean) * 100.

(d) (Mean / Variance) * 100.

64. In a chi-squared test, what does the chi-squared statistic measure ?

(a) The difference between observed and expected frequencies.

(b) The probability of observing a particular outcome.

(c) The goodness of fit between observed and expected frequencies.

(d) The probability of a Type I error.

65. What is the standard deviation of a binomial distribution ?

(a) n. (b) $np\,(1-p)$.

(c) $\sqrt{n}$. (d) $\sqrt{np\,(1-p)}$.

66. What is the formula for the coefficient of determination (R-squared) in linear regression ?

(a) $\sqrt{}$ (1 – SSreg/SStot). (b) $\sqrt{}$(Sreg / SStot).

(c) SSreg / SStot. (d) 1 - SSreg/SStot.

67. A company wants to test if there is a significant difference in the mean sales between two different store locations. Which statistical test should the company use ?

(a) Pearson correlation. (b) Wilcoxon signed-rank test.

(c) Mann-Whitney U test. (d) Independent t-test.

68. Which measure of skewness indicates a distribution with a longer tail to the left ?

(a) Positive skewness. (b) Negative skewness.

(c) Zero skewness. (d) Right skewness.

69. What is the formula for calculating the z-score ?

(a) $(X - \mu)/\sigma$. (b) $(X - \sigma)/\mu$

(c) $(X - \sigma) * \mu$ (d) $(X + \mu)/\sigma$.

70. In Bayesian inference, what does the likelihood function represent ?

(a) Prior beliefs about the parameters.

(b) Probability of observing the data given the parameters.

(c) Probability of the parameters given the data.

(d) Posterior distribution of the parameters.

71. What is the formula for calculating kinetic energy ?

(a) KE = mv. (b) KE = 1/2 mv^2.

(c) KE = mgh. (d) KE = Fd.

72. A projectile is launched from the ground with an initial velocity of 30 m/s at an angle of 60 degrees above the horizontal. Calculate the maximum height reached by the projectile. (Take acceleration due to gravity as 9.8 m/s^2)

(a) 10.5 meters. (b) 15.0 meters.

(c) 20.5 meters. (d) 25.0 meters.

73. What does the Heisenberg uncertainty principle state ?

(a) The position and momentum of a particle cannot both be precisely determined simultaneously.

(b) The energy and time of a particle cannot both be precisely determined simultaneously.

(c) The wavelength and frequency of a wave cannot both be precisely determined simultaneously.

(d) The speed and direction of a particle cannot both be precisely determined simultaneously.

74. What happens to the force between two point charges when the distance between them is doubled ?

(a) The force is halved. (b) The force is doubled.

(c) The force remains the same. (d) The force becomes zero.

75. According to special relativity, what happens to the mass of an object as its velocity approaches the speed of light ?

(a) The mass decreases. (b) The mass increases without bound.

(c) The mass remains constant. (d) The mass becomes zero.

76. A block of mass 5 kg. is initially at rest on a frictionless horizontal surface. A force of 20 N is applied horizontally to the block, causing it to move. Calculate the velocity of the block after it has traveled 10 meters. (Assume no external forces act on the block) :

(a) 4 m/s. (b) 6 m/s.

(c) 8 m/s. (d) 10 m/s.

77. What is the primary source of energy production in stars like the Sun ?

(a) Nuclear fusion. (b) Nuclear fission.

(c) Chemical reactions. (d) Gravitational collapse.

78. A radioactive substance has a half-life of 10 days. If the initial mass of the substance is 100 grams, how much of it will remain after 30 days ?

(a) 6.25 grams. (b) 12.5 grams.

(c) 25 grams. (d) 50 grams.

79. Which particle is responsible for mediating the electromagnetic force ?

(a) Photon. (b) Electron.

(c) Proton. (d) Neutrino.

80. An object is placed 20 cm. in front of a converging lens with a focal length of 10 cm. Calculate the position of the image formed by the lens.

(a) 10 cm. in front of the lens. (b) 20 cm. in front of the lens.

(c) 30 cm. in front of the lens. (d) 10 cm. behind the lens.

81. What is the functional group present in an alcohol molecule ?

(a) – OH. (b) – COOH.

(c) – CHO. (d) – NH2.

82. Calculate the change in entropy when 1 mole of ice at – 10°C is melted and heated to form steam at 100°C. (Given : $\Delta Hfus = 6.01$ kJ/mol, $\Delta Hvap = 40.79$ kJ/mol, specific heat capacity of water = 4.18 J/g°(C).

(a) 110.47 J/K. (b) 116.58 J/K.

(c) 122.69 J/K. (d) 128.80 J/K.

83. Which law states that the total pressure of a mixture of gases is equal to the sum of the partial pressures of the individual gases ?

(a) Boyle's law. (b) Charles's law.

(c) Dalton's law. (d) Gay-Lussac's law.

84. A solution contains 0.025 moles of NaOH in 500 mL of water. Calculate the pH of the solution. (Assume complete dissociation of NaOH)

(a) 12.00. (b) 12.30.

(c) 12.60. (d) 12.90.

85. Which technique is used to separate components of a mixture based on their different affinities for a stationary phase ?

(a) Spectroscopy. (b) Chromatography.

(c) Titration. (d) Electrophoresis.

86. Calculate the isoelectric point (pI) of a dipeptide composed of alanine (pKa = 2.34) and lysine (pKa = 10.53).

(a) 4.43. (b) 6.08.

(c) 7.94. (d) 9.45.

87. Acid rain is primarily caused by the emission of :

(a) Carbon dioxide. (b) Sulfur dioxide.

(c) Nitrogen dioxide. (d) Methane.

88. Which computational method is commonly used to calculate molecular properties and interactions ?

(a) Molecular dynamics. (b) Density functional theory (DFT).

(c) Hartree-Fock method. (d) Monte Carlo simulation.

89. Which industrial process is used to produce ammonia from nitrogen and hydrogen gases ?

(a) Haber-Bosch process. (b) Solvay process.

(c) Contact process. (d) Claus process.

90. The rate constant for a first-order reaction is 0.02 min^–1. If the initial concentration of the reactant is 0.10 M, how much time will it take for the concentration to decrease to 0.025 M ?

(a) 34.65 minutes. (b) 46.05 minutes.

(c) 57.45 minutes. (d) 68.85 minutes.

91. If all mammals are warm-blooded animals, and a bat is a mammal, what can be logically concluded ?

(a) All mammals are bats.

(b) Bats are warm-blooded animals.

(c) All warm-blooded animals are mammals.

(d) All mammals can fly.

92. Every time I eat strawberries, I get a stomach-ache. What can I conclude ?

(a) I am allergic to strawberries.

(b) Strawberries cause stomach-aches in everyone.

(c) I should eat more strawberries.

(d) Strawberries are the only cause of stomach-aches.

93. If a triangle has angles measuring 60° and 80°, what is the measure of the third angle ?

(a) 20°. (b) 40°.

(c) 60°. (d) 80°.

94. If a store sells a product for $ 20, which includes a 25 % profit margin, what is the cost of the product to the store ?

(a) $10. (b) $12.50.

(c) $15. (d) $16.

95. What letter comes next in the series : A, C, F, J, O,... ?

(a) S. (b) P.

(c) R. (d) Q.

96. A survey finds that 90 % of people who drink green tea regularly report improved health. What inference can be made ?

(a) Green tea improves health for everyone.

(b) 90 % of people have improved health.

(c) People with improved health tend to drink green tea regularly.

(d) Drinking green tea has no effect on health.

97. If a rectangle has a perimeter of 40 meters and a length-to-width ratio of 3 : 2, what are the dimensions of the rectangle ?

(a) 8 m. × 12 m. (b) 6 m. × 14 m.

(c) 10 m. × 15 m. (d) 12 m. × 18 m.

98. If a recipe calls for 3/4 cup of flour and you want to make 3 batches, how many cups of flour do you need in total ?

(a) 1/4 cup. (b) 3/4 cup.

(c) 1 1/4 cups. (d) 2 1/4 cups.

99. If P is the brother of Q, Q is the sister of R, and R is the father of S, then how is P related to S ?

(a) Brother. (b) Sister.

(c) Father. (d) Mother.

100. In a certain code language, "123" means "hot filtered coffee", "356" means "very hot day" and "589" means "day and night". Which digit means "very" ?

(a) 9. (b) 6.

(c) 5. (d) 3.

C 41682 (Pages : 16) Name.....

Reg. No.....

P.G./INTEGRATED P.G. ENTRANCE EXAMINATION, APRIL 2023

MASTER OF COMPUTER APPLICATION (MCA)

Time : Two Hours Maximum : 400 Marks

Each answer carries 4 marks.
1 mark will be deducted for each wrong answer.

1. Which of the following delays is faced by the packet traveling from one end system to another ?

   (A) Propagation delay. (B) Queuing delay.

   (C) Transmission delay. (D) All of the mentioned.

2. Two devices are in-network if ————.

   (A) A process in one device is able to exchange information with a process in another device.

   (B) A process is running on both devices.

   (C) PIDs of the processes running on different devices are the same.

   (D) A process is active and another is inactive.

3. The length of an IPv6 address is ?

   (A) 32 bits. (B) 64 bits.

   (C) 128 bits. (D) 256 bits.

4. Which of the following is true with regard to the ping command ?

   (A) Ping stands for Packet Internet Generator.

   (B) The ping command checks the port level connectivity between source destinations end points.

   (C) Ping summarizes the packet loss and round-trip delay between two IP end points.

   (D) The ping command activates the RARP protocol of the IP layer.

5. The private key in asymmetric key cryptography is kept by ?

   (A) Sender. (B) Receiver.

   (C) Sender and Receiver. (D) None of the these.

6. Why the following statement is erroneous ?

```
SELECT dept_name ID avg salary
FROM instructor
GROUP BY dept_name ;
```

(a) Dept_id should not be used in group by clause.

(b) Group by clause is not valid in this query.

(c) Avg (salary) should not be selected.

(d) None.

7. A primary key if combined with a foreign key creates :

(A) Parent-Child relationship between the tables that connect them.

(B) Many to many relationships between the tables that connect them.

(C) Network model between the tables that connect them.

(D) None of the above.

8. ——— is a set of column that identifies every row in a table.

(A) Composite key. (B) Candidate key.

(C) Foreign key. (D) Super key.

9. Which of the following is/are the DDL statements ?

(A) Create. (B) Drop.

(C) Alter. (D) All of the above.

10. Which can be used to delete all the rows if a table ?

(A) Delete * from table_name

(B) Delete from table_name.

(C) Delete table_name.

(D) all rows cannot be deleted at a time.

11. There are ——— general purpose registers in 8085 processor

(A) 5. (B) 6.

(C) 7. (D) 8.

12. What is true about microprocessor ?

(A) Microprocessor is a controlling unit of a micro-computer.

(B) It is fabricated on a small chip capable of performing ALU (Arithmetic Logical Unit) operations.

(C) It also communicate with the other devices connected to it.

(D) All of the above.

13. It determines the number of operations per second ?

(A) Bandwidth. (B) Word Length.

(C) Clock Speed. (D) Operations Speed.

14. Which of the following is not a CISC processors ?

(A) IBM 370/168. (B) Dell 5435.

(C) Intel 80486. (D) VAX 11/780.

15. At what PIN number there is a RESET pin, which is used to reset the microcontroller to its initial values ?

(A) PIN 9. (B) B. PIN 20.

(C) C. PIN 30. (D) D. PIN 35.

16. The addition of a neutron to the nucleus of an atom :

(A) Increases the atomic mass of the atom.

(B) Decreases the atomic mass of the atom.

(C) Increases the charge on the nucleus.

(D) Decreases the charge on the nucleus

17. Which of the following statements regarding natural radioactivity is true ?

(A) It is spontaneous disintegration of atoms.

(B) It is induced by bombardment with projectiles.

(C) It is transmutation of atoms with projectiles.

(D) It is dependent on temperature.

18. Internal energy of the elements is assigned a value of ——— cal per mole at standard states.

(A) 5. (B) 7.

(C) 77. (D) 0.

19. The enthalpy of the elements in their standard states is taken as zero. So the enthalpy of formation of a compound may be :

(A) Negative. (B) Positive.

(C) Zero. (D) Negative or positive.

20. $K_2O + H_2O \rightarrow$

(A) $K(OH)_3$. (B) KOH.

(C) $KOH.H_2O$. (D) $KO + H_2 + O_2$.

21. Soda water ($H_2CO_3(aq)$) has a pH of :

(A) 1. (B) 2.

(C) 3. (D) 4.

22. Consider equation $Z_nO + NaOH + H_2O \rightarrow Na_2Zn(OH)_4$. Moles of H_2O required to balance equation would be :

(A) 3. (B) 5.

(C) 1. (D) 2.

23. When there is a link between product and reactant with a transfer of proton that pair is called :

(A) Acid pair. (B) Proton pair.

(C) Conjugate pair. (D) Base pair.

24. Carboxylic acids produce salt plus water by reacting with :

(A) Acids. (B) Bases.

(C) Alkalis. (D) Water.

25. Phenolphthalein changes color in :

(A) Acids. (B) Alkalis.

(C) Water. (D) Salt solutions.

26. The mass and energy equivalent to 1 a.m.u. respectively are :

(A) 1.67×10^{-27} g, 9.30 MeV. (B) 1.67×10^{-27} kg, 930 MeV.

(C) 1.67×10^{-27} kg, 1 MeV. (D) 1.67×10^{-34} kg, 1 MeV

27. Number of electrons that constitute one ampere of current is :

(A) 265×10^{16}. (B) B 625×10^{12}.

(C) 4.8×10^{10}. (D) D 625×10^{16}.

28. When a body is projected upwards :

(A) The time for the upward journey and downward journey are the same.

(B) B the upward journey takes more time.

(C) The downward journey takes more time.

(D) Can't be said.

29. The period of a geostationary (synchronous) satellite orbiting the earth over the equator la :

(A) 16 hours. (B) B 12 hours.

(C) 20 hours. (D) 24 hours.

30. The motion of the pendulum of a wall clock is an example of :

(A) Linear motion. (B) Rotational motion.

(C) Vibratory motion. (D) None of the above.

31. The current carried in a PNP transistor is :

(A) Free electrons. (B) Acceptor ions.

(C) Donor ions. (D) Holes.

32. An inverter gate can be developed using :

(A) Two diodes.

(B) Resistance and capacitance.

(C) Transistor.

(D) Inductance and capacitance.

33. An EMF source of 8.0 V is connected to a purely resistive electrical appliance. An electric current of 2.0 A flows through it. What is the resistance offered by the electrical appliances ?

(A) 4 ohm. (B) 6 ohm.

(C) 2 ohm. (D) 3 ohm.

34. Which of the following statements is true about inertia ?

(A) Inertia is the property of a body by virtue of which the body is unable to change by itself the state of rest.

(B) Inertia is the property of a body by virtue of which the body is able to change by itself the state of rest.

(C) Inertia is the property of a body by virtue of which the body is unable to change by itself the direction of motion.

(D) Inertia is the property of a body by virtue of which the body is unable to change by itself the state of rest and uniform Linear motion.

35. Photocell is a device to :

(A) Store photons.

(B) Measure light intensity.

(C) Convert photon energy into mechanical energy.

(D) Store electrical energy for replacing storage batteries.

36. Statements: Some actors are singers. All the singers are dancers.

Conclusions :

(I) Some actors are dancers.

(II) No singer is actor.

(A) Only (I) conclusion follows. (B) Only (II) conclusion follows.

(C) Either (I) or (II) follows. D Both (I) and (II) follow.

37. Introducing a boy, a girl said, "He is the son of the daughter of the father of my uncle". How is the boy related to the girl ?

(A) Son-in-law. (B) Nephew.

(C) Uncle. (D) Brother.

38. Complete the series :

ATTRIBUTION, TTRIBUTIO, RIBUTIO, IBUTI, ?

(A) IBU. (B) UT.

(C) UTI. (D) BUT.

39. A, B, C, D and E are sitting on a bench, A is sitting next to B, C is sitting next to D, D is not sitting with E who is on the left end of the bench. C is on the second position from the right. A is to the right of B and E. A and C are sitting together. In which position A is sitting ?

(A) Between B and D. (B) Between B and C.

(C) Between E and D. (D) Between C and E.

40. If South-East becomes North, North-East becomes West and so on. What will West become ?

(A) North-East. (B) North-West.

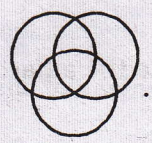
(C) South-East. (D) South-West.

41. A number of friends decided to go on a picnic and planned to spend Rs. 96 on eatables. Four of them, however, did not turn up. As a consequence, the remaining ones had to contribute Rs. 4 each extra. The number of those who attended the picnic was :

(A) 12. (B) 8.

(C) 6. (D) 11.

42. Which of the following diagrams indicates the best relation between Elephant, Carnivorous and Tiger ?

(A)  (B) 

(C)  (D) 

43. Question : How many children does M have ?

Statements :

I. H is the only daughter of X who is wife of M.

II. K and J are brothers of M.

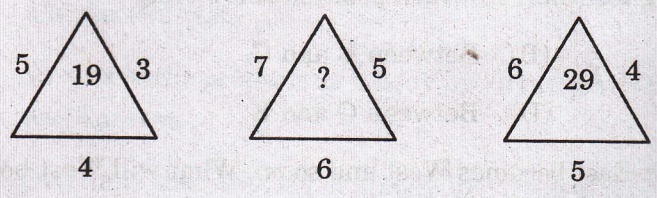
(A) I alone is sufficient while II alone is not sufficient.

(B) II alone is sufficient while I alone is not sufficient.

(C) Either I or II is sufficient.

(D) Neither I nor II is sufficient.

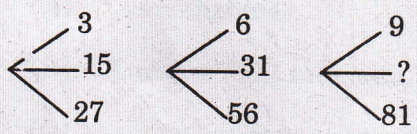
44. Which one wilt replace the question mark ?



(A) 25. (B) 37.

(C) 41. (D) 47.

45. Which one will replace the question mark ?



(A) 45. (B) 41.

(C) 32. (D) 40.

46. Which traversal process all of the vertex descendants before we move to the adjacent vertex ?

(A) Depth first. (B) Breadth first.

(C) Depth limited. (D) Width first.

47. Herder node is used as sentinel in _____.

(A) Queues. (B) Stacks.

(C) Graphs. (D) Binary tree.

48. One can convert a binary tree into its mirror image by traversing it in _____.

(A) Postorder. (B) Preorder.

(C) Inorder. (D) None of the above.

49. What is the worst-case run-time complexity of the binary search algorithm ?

(A) A – O (n^2).

(B) B – O ($n^{\log n}$).

(C) C – O (n^3).

(D) D – O (n).

50. Minimum number of spanning tree in a connected graph is :

(A) n.

(B) $n^n - 1$.

(C) 0.

(D) 1.

51. Which one of the following is not a real time operating system ?

(A) RTLinux.

(B) Palm OS.

(C) QNX.

(D) VxWorks.

52. The FCFS algorithm is particularly troublesome for _____.

(A) Operating systems.

(B) Multiprocessor systems.

(C) Time sharing systems.

(D) Multiprogramming systems.

53. On systems where there are multiple operating system, the decision to load a particular one is done by _____.

(A) Process control block.

(B) File control block.

(C) Boot loader.

(D) Bootstrap.

54. Consider the following set of processes, the length of the CPU burst time given in milliseconds.

Process		*Burst time*
P1	...	6
P2	...	8
P3	...	7
P4	...	3

Assuming the above process being scheduled with the SJF scheduling algorithm.

(A) The waiting time for process P1 is 3 ms.

(B) The waiting time for process P1 is 0 ms.

(C) The waiting time for process P1 is 16 ms.

(D) The waiting time for process P1 is 9 ms.

55. To avoid the race condition, the number of processes that may be simultaneously inside their critical section is :

(A) 8.

(B) 1.

(C) 16.

(D) 0.

56. Which of the following is not the member of class ?

(A) Static function.

(B) Friend function.

(C) Const function.

(D) Virtual function.

57. Which operator cannot be overloaded ?

(A) +.

(B) −.

(C) *.

(D) ::.

58. What happens if the following C++ statement is compiled and executed ?

```
int *ptr = NULL ;
delete ptr;
```

(A) The program is not semantically correct.

(B) The program is compiled and executed successfully.

(C) The program gives a compile-time error.

(D) The program compiled successfully but throws an error during run-time.

59. Which is more effective while calling the C++ functions ?

(A) Call by object.

(B) Call by pointer.

(C) Call by value.

(D) Call by reference.

60. What is abstract class in C++ ?

(A) Any Class in C++ is an abstract class.

(B) Class from which any class is derived.

(C) Class specifically used as a base class with atleast one virtual functions.

(D) Class specifically used as a base class with atleast one pure virtual functions.

61. What are the variables whose calculation is done according to the weight, height, and length known as ?

(A) Flowchart variables. (B) Discrete variables.

(C) Continuous variables. (D) Measuring variables.

62. A problem in mathematics is given to three students A, B and C. If the probability of A solving the problem is 1/2 and B not solving it is 1/4. The whole probability of the problem being solved is 63/64 then what is the probability of solving it ?

(A) 1/8. (B) 1/64.

(C) 7/8. (D) 1/2.

63. If A and B are two mutually exclusive events with P (~A) = 5/6 and P (b) – 1/3 then P(A /~B) is equal to ————.

(A) 1/4. (B) 1/2.

(C) 0, since mutually exclusive. (D) 5/18.

64. What is the probability of an impossible event ?

(A) 0. (B) 1.

(C) Not defined. (D) Insufficient data.

65. For larger values of '*n*', Binomial Distribution ————.

(A) Loses its discreteness. (B) Tends to Poisson Distribution.

(C) Stays as it is. (D) Gives oscillatory values.

66. If 'm' is the mean of a Poisson Distribution, then variance is given by ————.

(A) m^2. (B) m½.

(C) m. (D) m/2.

67. The statistic used for estimating a parameter of a population is called :

(A) Estimator. (B) Estimate.

(C) Both (A) and (B). (D) Neither (A) nor (B).

68. Branch of statistical inference which assumes that the underlying population distribution is known as :

(A) Parametric statistical inference.

(B) Non-parametric statistical inference.

(C) Distribution free methods.

(D) All the above.

69. For two unbiased estimators T1 and T2, if V (T1) > V (T2), then :

(A) T1 is more efficient than T2.

(B) T2 is more efficient than T1.

(C) T1 and T2 are equally efficient.

(D) None of the above.

70. To test if the given normal population has a specified variance, we make use of :

(A) Z - test. (B) t - test.

(C) F - test. (D) χ^2 -test

71. If x is a set and the set contains an integer which is neither positive nor negative then the set x is ———.

(A) Set is Empty. (B) Set is Non-empty.

(C) Set is Finite.. (D) Set is both Non- empty and Finite.

72. If $x \in N$ and x is prime, then x is ——— set.

(A) Infinite set. (B) Finite set.

(C) Empty set. (D) Not a set.

73. What is the Cartesian product of set A and set B, if the set A = {1, 2} and set B = {a, b} ?

(A) {(1, a), (1, b), (2, a), (b, b) }. (B) { (1, 1), (2, 2), (a, a), (b, b) }.

(C) {(1, a), (2, a), (1, b), (2, b)}. (D) {(1, 1), (a, a), (2, a), (1, b)}.

74. Convert the set x in roster form if set x contains the positive prime number, which divides 72.

(A) {$\varnothing$}. (B) {2, 3}.

(C) {2, 3, 7}. (D) {3, 5, 7}.

75. A line which cuts a pair of parallel lines is called :

(A) Tangent. (B) Chord.

(C) Traversal. (D) Intersector.

76. An amount of Rs. 10,000 becomes Rs. 20,736 in 2 years. If the rate of interest is compounded half yearly, what is the annual rate of interest ?

(A) 25 %. (B) 20 %.

(C) 40 %. (D) 30 %.

77. $4950/6 + 112 \times 1.75 = ? \times 2$:

(A) 510.5. (B) 505.2.

(C) 515.5. (D) None of the above.

78. If $P^x = Q^y = R^z$ and $Q/P = R/Q$, then $2z/(x + z) = ?$

(A) y/z. (B) y/x.

(C) x/y. (D) z/y.

79. A, B and C can complete a piece of work in 14, 6 and 12 days respectively. Working together, they will complete the work in :

(A) 19/9 days. (B) 27 days.

(C) 28/9 days. (D) 25/8 days.

80. Consider ΔABD such that angle ADB = 20° and C is a point on BD such that AB = AC and CD = CA. Then the measure of angle ABC is :

(A) 30°. (B) 40°.

(C) 45°. (D) 60°.

81. $4^2 + |4| + |-4| - 4^2 = ?$

(A) -4. (B) 0.

(C) 4. (D) 8.

82. $\sqrt[1]{\sqrt{64}} = ?$

(A) $\sqrt{2}$. (B) 2.

(C) 4. (D) 8.

83. If $a = b$ and $b = c$, then $a = (c)$ This property is called ?

(A) Reflexive. (B) Transitive.

(C) Trichotomy. (D) Symmetric.

84. If $x^2 + 1 = 0$, then $x = ?$

(A) 1. (B) i.

(C) ± 1. (D) $\pm i$.

85. What is the 31st term of the sequence: 1, 4, 7, 10, ——— ?

(A) 90. (B) 91.

(C) 92. (D) 93.

86. If $2^r = 32$, then $x = ?$

(A) 2. (B) 3.

(C) 4. (D) 5.

87. The line $y = mx + c$ intersects the circle $x^2 + y^2 = a^2$ at the most of ——— points.

(A) 1. (B) 2.

(C) 3. (D) 4.

88. The perpendicular distance from the point (3, – 4) to the line $3x^2 - 4x + 10 = 0$.

(A) 7. (B) 8.

(C) 9. (D) 10.

89. $n(n-1) \times ..... \times 3 \times 2 \times 1 = ?$

(A) $n!$. (b) ${}^nC_r$.

(B) ${}^nP_r$. (D) n.

90. If $f(x) = 10^x$ then $f^{-1}(x) = ?$

(A) e^x. (B) $\ln x$.

(C) $\log x$. (D) $10e^x$.

91. For a certain distribution, if $\sum(X-20)=25$, $\sum(X-25)=0$, and $\sum(X-35)=-25$, then is equal to :

(A) 20. (B) 25.

(C) 35. (D) – 20.

92. The n^{th} term of an arithmetic progression $a + (a + d) + (a + 2d) + ...$ is

(A) $a + nd$. (B) $a + (n - 1)\, d$.

(C) $a + (n + 1)\, d$. (D) $2a + (n + 1)\, d$.

93. The proposition $\sim p \vee (p \vee q)$ is a :

(A) Tautology. (B) Contradiction.

(C) Logical equivalence. (D) None of the above.

94. A vector field with a vanishing curl is called as ———.

(A) Irrotational. (B) Solenoidal.

(C) Rotational. (D) Cycloidal.

95. Vector Analysis was discovered by :

(A) Sir James Chadwick

1. Sir Willard Gibbs.
2. Sir Anaximander.
3. Sir Ehzebeth Friedmann.

(A) For two invertible matrices A and B of suitable orders, the value of $(AB)^{-1}$ is :

(A) $(BA)^{-1'}$. (B) $B^{-1} A^{-1}$.

(C) $A^{-1} B^{-1}$. (D) $(AB')^{-1}$.

96. The matrix product AB = O, then :

(A) A = O and B = O. (B) A = O or B = O.

(C) A is null matrix. (D) None of these.

97. The number of solution of the following equations $x_2 - x_3 = 1, -x_1 + 2x_3 = -2, x_1 - 2x_2 = 3$ is :

(A) Zero. (B) One.

(C) Two. (D) Infinite.

98. Which of the following is not true ?

(A) Every skew-symmetric matrix of odd order is non-singular.

(B) If determinant of a square matrix is non-zero, then it is non-singular.

(C) Adjoint of symmetric matrix is symmetric.

(D) Adjoint of a diagonal matrix is diagonal.

99. The system of equations $x_1 - x_2 + x_3 = 2, 3x_1 - x_2 + 2x_3 = -6$ and $3x_1 + x_2 + x_3 = -18$ has :

(A) No solution. (B) Exactly one solution.

(C) Infinite solutions. (D) None of these.

100. The values of variables that make the equation true are classified as :

() Roots of equation. (B) Value of equation.

(C) Solution of equation. (D) Degree of equation.