22

QUESTION PAPER SERIES CODE
A

Registration No. : | | | | | |

Centre of Exam. : _____

Name of Candidate : _____

_____
Signature of Invigilator

ENTRANCE EXAMINATION, 2018

MASTER OF COMPUTER APPLICATIONS

[Field of Study Code : MCAM (224)]

Time Allowed : 3 hours *Maximum Marks* : 100

INSTRUCTIONS FOR CANDIDATES

Candidates must read carefully the following instructions before attempting the Question Paper :

(i) Write your Name and Registration Number in the space provided for the purpose on the top of this Question Paper and in the Answer Sheet.

(ii) **Please darken the appropriate Circle of Question Paper Series Code on the Answer Sheet.**

(iii) All questions are compulsory.

(iv) Answer all the 100 questions in the Answer Sheet provided for the purpose by darkening the correct choice, i.e., (a) or (b) or (c) or (d) with BALLPOINT PEN only against the corresponding circle. Any overwriting or alteration will be treated as wrong answer.

(v) Each correct answer carries **1** mark. **There will be no negative marking.**

(vi) Answer written by the candidates inside the Question Paper will not be evaluated.

(vii) Pages at the end have been provided for Rough Work.

(viii) Return the Question Paper and Answer Sheet to the Invigilator at the end of the Entrance Examination. **DO NOT FOLD THE ANSWER SHEET.**

INSTRUCTIONS FOR MARKING ANSWERS

1. Use only Blue/Black Ballpoint Pen (do not use pencil) to darken the appropriate Circle.
2. Please darken the whole Circle.
3. Darken ONLY ONE CIRCLE for each question as shown in the example below :

Wrong	Wrong	Wrong	Wrong	Correct
● ⓑ ⓒ ●	Ⓐ ⓑ ⓒ ⓓ	Ⓐ ⓑ ⓒ Ⓓ	◉ ⓑ ⓒ ●	ⓐ ⓑ ⓒ ●

4. Once marked, no change in the answer is allowed.
5. Please do not make any stray marks on the Answer Sheet.
6. Please do not do any rough work on the Answer Sheet.
7. Mark your answer only in the appropriate space against the number corresponding to the question.
8. **Ensure that you have darkened the appropriate Circle of Question Paper Series Code on the Answer Sheet.**

1. Let $f(x) = ax^2 + bx + c$ be a polynomial with a repeated root. What is the relation satisfied by the coefficients?

(a) $c = \left(\frac{b}{2}\right)^2$

(b) $ac = \left(\frac{b}{2}\right)^2$

(c) $c = \left(\frac{b}{a}\right)^2$

(d) $bc = (2a)^2$

2. A pair of fair dice (cubes with faces numbered 1 to 6) is thrown. What is the chance that one of the numbers obtained is 6, given that the sum of the numbers obtained is 8?

(a) 11/36

(b) 1/6

(c) 2/5

(d) 5/36

3. The remainder obtained after $x^3 + x^2 + x + 1$ is divided by $x^2 + x + 1$ is

(a) 1

(b) x

(c) $x + 1$

(d) 0

4. $\int_0^{\pi/2} \frac{\sqrt{(\sin x)}\, dx}{\sqrt{(\sin x)} + \sqrt{(\cos x)}}$ is

(a) $\frac{\pi}{2}$

(b) $\frac{\pi}{4}$

(c) π

(d) $\frac{\pi}{8}$

5. Two vectors a and b are given by $a = 2i - 3j - k$ and $b = i + 4j - 2k$. What is the cross product $a \times b$?

(a) $10i + j + 11k$

(b) $10i + 3j - 11k$

(c) $10i + j - 11k$

(d) $10i + 3j + 11k$

6. The convergence of which of the following methods is sensitive to starting value?

(a) False position method

(b) Gauss-Seidel method

(c) Newton-Raphson method

(d) All of the above

7. Which of the following is ***not*** true about the number zero?

(a) Even

(b) Positive

(c) Additive identity

(d) Additive inverse of zero

8. If $u = \log \tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)$, then $\tanh\frac{u}{2}$ is equal to

(a) $\tan\theta$

(b) $\tan\frac{\theta}{2}$

(c) $\tan\frac{\theta}{4}$

(d) $\tan 2\theta$

9. Consider a line passing through (1, 2) and (4, 8). Gradient of this line is equal to

(a) $\frac{1}{2}$

(b) $-\frac{1}{2}$

(c) 2

(d) –2

10. A relational database consists of a collection of

(a) tables

(b) fields

(c) records

(d) keys

11. Which one of the following is ***not*** a reserved keyword for C?

(a) Auto

(b) Case

(c) Main

(d) Default

12. Consider a universal set $U = \{1, 2, 3, 4, 5\}$ and the sets $A = \{1, 5\}$ and $B = \{1, 2, 3, 4\}$. Then the set $A \cup \overline{B}$ is

(a) {1, 2, 3, 4, 5}

(b) {1, 3, 5}

(c) {2, 3, 4}

(d) {1, 5}

13. What is the minimum number of two-input NAND gates used to perform the function of two-input OR gate?

(a) One

(b) Two

(c) Three

(d) Four

14. In linked list, each node contains minimum of two fields. One field is data field to store the data. What is the second field?

(a) Pointer to character

(b) Pointer to integer

(c) Pointer to node

(d) Node

15. The value of $\left(\frac{1}{\log_4 120} + \frac{1}{\log_5 120} + \frac{1}{\log_6 120}\right)$ is

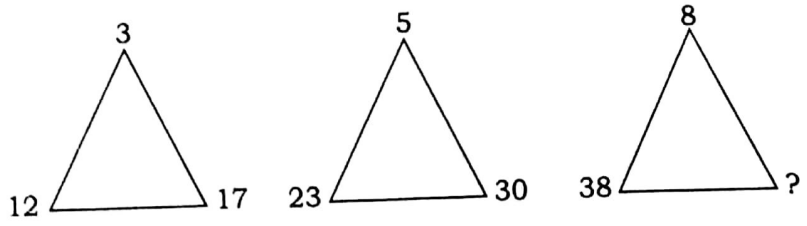
(a) 0

(b) 1

(c) 5

(d) 120

16. Which number replaces the question mark?



(a) 44

(b) 45

(c) 46

(d) 47

17. $(256)^{0.16} \times (256)^{0.09} = ?$

(a) 4

(b) 16

(c) 64

(d) 256

18. Let α, β be the roots of the polynomial $f(x) = x^2 + 7x + 8$. What is the value of the expression $\alpha^2 + \alpha\beta + \beta^2$?

(a) 7

(b) 17

(c) 32

(d) 41

19. A fair coin is tossed 4 times independently. What is the chance of getting at least 1 head?

(a) 1/16

(b) 1/4

(c) 5/8

(d) 15/16

20. The surface area of the solid generated by revolving the circle $x^2 + (y-b)^2 = a^2$, $b \geq a$ about the x-axis is

(a) $\pi^2 ab$

(b) $2\pi^2 ab$

(c) $3\pi^2 ab$

(d) $4\pi^2 ab$

21. The value of $\lim_{\theta \to 0} \frac{\sin\theta}{\theta}$ is

(a) 0

(b) 1

(c) π

(d) $\frac{1}{2}$

22. To remove a relation from an SQL database, we use the _____ command.

(a) delete

(b) purge

(c) remove

(d) drop table

23. Let R be the relation in the natural numbers $N = \{1, 2, 3, \cdots\}$, defined by $R = \{(x, y) \mid x \in N, y \in N, x + 2y = 10\}$. Which one of the properties does R have?

(a) Reflexive

(b) Symmetric

(c) Antisymmetric

(d) Transitive

24. It has been established that

P : Einstein was

Q : although a great scientist

R : weak in arithmetic

S : right from his school days

The proper sequence should be

(a) SRPQ

(b) QPRS

(c) QPSR

(d) RQPS

25. Runtime mapping from virtual to physical address is done by

(a) memory management unit

(b) CPU

(c) PCI

(d) None of the above

26. If $y = x^{x^{x^{\cdots\infty}}}$, then $x\frac{dy}{dx}$ is

(a) $\frac{y^2}{1+y\log x}$

(b) $\frac{y}{1-y\log x}$

(c) $\frac{y^2}{1-y\log x}$

(d) $\frac{y^2}{y\log x-1}$

27. The determinant

$$\begin{vmatrix} 1 & 2 & 4 \\ 1 & 3 & 9 \\ 1 & 4 & 16 \end{vmatrix}$$

is

(a) 0

(b) 2

(c) 6

(d) 24

28. In a gathering of students, 75% knew some probability, 30% knew some statistics and 20% knew some amount of both. What proportion of the students had some knowledge of either probability or statistics?

(a) 15%

(b) 30%

(c) 75%

(d) 85%

29. What is the value of scalar m, so that the vectors $a = 2i + mj + k$ and $b = 4i - 2j - 2k$ are perpendicular?

(a) 2

(b) 3

(c) 4

(d) 0

30. Match the following :

A. Newton-Raphson	1. Integration
B. Runge-Kutta	2. Root finding
C. Gauss-Seidel	3. Ordinary differential equations
D. Simpson's rule	4. Solution of system of linear equations

The correct sequence is

(a) A B C D
2 3 4 1

(b) A B C D
3 2 1 4

(c) A B C D
1 4 2 3

(d) A B C D
4 1 2 3

31. Which of the following numbers is ***not*** irrational?

(a) π

(b) $\sqrt{2}$

(c) $\sqrt{3}$

(d) $\sqrt{4}$

32. If $\cos\theta + \sin\theta = 1$, then the value of $\sin 2\theta$ is equal to

(a) 1

(b) 0

(c) $\frac{1}{2}$

(d) -1

33. Which one of the following join conditions contains an equality operator?

(a) Equijoin

(b) Cartesian

(c) Natural

(d) Left

34. A pointer that is pointing to NOTHING is called

(a) VOID pointer

(b) DANGLING pointer

(c) NULL pointer

(d) WILD pointer

35. Which one of the logical operators is represented by $\otimes$ in the following truth table of two propositions p and q?

p	q	$p \otimes q$
T	T	T
T	F	F
F	T	F
F	F	F

(a) Conjunction

(b) Disjunction

(c) Negation

(d) Implication

36. The total number of digits used in numbering the pages of a book having 366 pages is

(a) 732

(b) 990

(c) 1098

(d) 1305

37. In a binary search tree, which of the foliowing traversals would print the numbers in the ascending order?

(a) Level-order traversal

(b) Pre-order traversal

(c) Post-order traversal

(d) In-order traversal

38. The number of solutions of

$$\begin{pmatrix} 1 & 0 & 5 \\ 0 & 1 & 6 \\ 1 & 0 & 5 \end{pmatrix} x = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$$

is

(a) 0

(b) 1

(c) infinite

(d) None of the above

39. If $x = r\cos\theta$, $y = r\sin\theta$, then

$$\left(\frac{\partial r}{\partial x}\right)^2 + \left(\frac{\partial r}{\partial y}\right)^2$$

is

(a) 3

(b) 2

(c) 1

(d) 0

40. A process is

(a) a program in secondary memory

(b) a program in execution

(c) a program in high-level language kept in disk

(d) a content of main memory

41. Let the sets A and B have 5 common elements. Then the number of elements common to $A \times B$ and $B \times A$ is

(a) 5

(b) 2^5

(c) 5^2

(d) 0

42. Apply Newton-Raphson technique to solve $x^2 - 2 = 0$. If initial guess is $x_0 = 1 \cdot 0$, subsequent estimate of x (i.e., x_1) will be

(a) 1·315

(b) 1·5

(c) 2·0

(d) 3·0

43. Fill in the end of the following series :

JAK, KBL, LCM, MDN, _____

(a) OEP

(b) NEO

(c) MEN

(d) PFQ

44. What is the postfix expression of the infix expression A + B*C?

(a) AB + C*

(b) ABC*+

(c) +AB*C

(d) ABC+*

45. A pineapple costs ₹7. A watermelon costs ₹5. X spends ₹38 on these fruits. The number of pineapples purchased is

(a) 2

(b) 3

(c) 4

(d) Data inadequate

46. Which of the unit vectors is perpendicular to the plane of vectors $a = 2i - 6j - 3k$ and $b = 4i + 3j - k$?

(a) $\frac{3}{7}i - \frac{2}{7}j + \frac{6}{7}k$

(b) $\frac{1}{7}i + \frac{2}{7}j + \frac{6}{7}k$

(c) $\frac{3}{7}i + \frac{2}{7}j + \frac{5}{7}k$

(d) $\frac{3}{7}i - \frac{4}{7}j + \frac{6}{7}k$

47. $\int \log x \, dx$ is

(a) $x\log(x/e)$

(b) $x\log(x)$

(c) $x\log(e/x)$

(d) $\log(e \cdot x)$

48. The sum of products can be implemented with a group of

(a) NOT gates

(b) OR gates

(c) AND gates

(d) XOR gates

49. Which word does ***not*** belong with the others?

(a) Lotus

(b) Rose

(c) Bud

(d) Tulip

50. The keyword 'break' cannot be simply used within

(a) do-while

(b) if-else

(c) for

(d) while

51. Given that $x = -1$ is a root of the polynomial $f(x) = x^3 - 4x^2 - 89x - 84$. Which of the following is another root of $f(x)$?

(a) 12

(b) 7

(c) 5

(d) –5

52. How many different arrangements of 3 identical blue beads and 2 identical green beads can be made on a straight line?

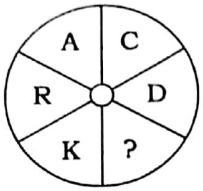
(a) 120

(b) 24

(c) 20

(d) 10

53. Which letter replaces the question mark?



(a) F

(b) G

(c) L

(d) H

54. The degree of multiprogramming is

(a) the number of processes executed per unit time

(b) the number of processes in the ready queue

(c) the number of processes in the I/O queue

(d) the number of processes in memory

55. The edges of the parallelepiped are represented by the vectors $a = 2i - 3j$, $b = i + j - k$ and $c = 3i - k$. What is the volume of the parallelepiped?

(a) 1

(b) 8

(c) 4

(d) 6

56. Which one of the following operations is commutative?

(a) Division in positive real numbers

(b) Subtraction in integers

(c) Multiplication in $n \times n$ matrices

(d) Addition in $n \times m$ matrices

57. Who is known as the father of C language?

(a) James A. Gosling

(b) Bjarne Stroustrup

(c) Dennis Ritchie

(d) Dr. E. F. Codd

58. If P be the point (2, 3, –1), what is the equation to the plane through P at right angles to the line OP, where O is the region?

(a) $2x + 3y - z = 14$

(b) $2x - 3y - z = 14$

(c) $x - 3y + z = 14$

(d) $-x - 3y + z = 14$

59. If for real value of x, $\cos\theta = x + \frac{1}{x}$, then

(a) θ is an acute angle

(b) θ is a right angle

(c) θ is an obtuse angle

(d) no value of θ is possible

60. Here are some words translated from an artificial language :

granamelke means big tree

pinimelke means little tree

melkehoon means tree house

Which word could mean 'big house'?

(a) granahoon

(b) pinishur

(c) pinihoon

(d) melkegrana

61. The most significant bit of arithmetic addition is called

(a) overflow

(b) carry

(c) output

(d) zero bit

62. Time quantum is defined in

(a) shortest job scheduling algorithm

(b) round-robin scheduling algorithm

(c) priority scheduling algorithm

(d) multilevel queue scheduling algorithm

[P.T.O.

63. Which of the following applies to the bisection method used for finding roots of functions?

(a) Converges within a few iterations

(b) Guaranteed to work for all continuous functions

(c) Is faster than the Newton-Raphson method

(d) Requires that there be no error in determining the sign of the function

64. The nth derivative of $\sin(ax+b)$ is

(a) $a^n \sin\left(ax+b+\frac{1}{2}n\pi\right)$

(b) $a^n \sin(ax+b+n\pi)$

(c) $a^n \sin(ax+b+2n\pi)$

(d) $a^n \sin(ax+b+\frac{1}{4}n\pi)$

65. If you write down all the numbers from 1 to 100, then how many times do you write 3?

(a) 11

(b) 18

(c) 20

(d) 21

66. If 100 cats kill 100 mice in 100 days, then 4 cats would kill 4 mice in how many days?

(a) 1 day

(b) 4 days

(c) 40 days

(d) 100 days

67. Which one of the following is the deadlock avoidance algorithm?

(a) Banker's algorithm

(b) Round-robin algorithm

(c) Elevator algorithm

(d) Karn's algorithm

68. If a hemisphere has a curved surface area of 175 cm^2, its radius is

(a) 4·38 cm

(b) 3·45 cm

(c) 28·5 cm

(d) 5·28 cm

69. The focus of the parabola $y = -2(x+4)^2 - 1$ is

(a) (2, 11/8)

(b) (–2, –11/8)

(c) (4, 9/8)

(d) (–4, –9/8)

70. The number of attributes in relation is called as its

(a) cardinality

(b) degree

(c) tuple

(d) entity

[P.T.O.

71. The greatest common divisor of $3^{11} - 3^{17}$ and $2^{12} - 3^{9}$ is

(a) 3^0

(b) 3^1

(c) 3^3

(d) 3^5

72. What is the worst case complexity of quick sort?

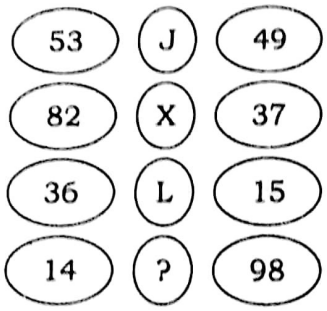
(a) $O(n \log n)$

(b) $O(\log n)$

(c) $O(n)$

(d) $O(n^2)$

73. Which letter replaces the question mark?



(a) B

(b) C

(c) D

(d) E

74. If a and b are unit vectors and θ is the angle between them, what is the value of $\sin\frac{\theta}{2}$?

(a) $\frac{1}{2}|a-b|$

(b) $\frac{1}{2}|a+b|$

(c) $|a-b|$

(d) $|a+b|$

75. How many different committees of 3 people can be made from a class of 10 students?

(a) 120

(b) 24

(c) 20

(d) 10

76. The eigenvalues of $\begin{pmatrix} 4 & 1 \\ -1 & 2 \end{pmatrix}$ are

(a) 3, 3

(b) 4, 2

(c) 1, –1

(d) 3, –3

77. The full form of SQL is

(a) Standard Query Language

(b) Sequential Query Language

(c) Structured Query Language

(d) Server Side Query Language

78. If $X = 1010100$ and $Y = 1000011$, using 2's complement X-Y is

(a) 1011101

(b) 10110010

(c) 1001100

(d) 10001

79. If the elements *A*, *B*, *C* and *D* are placed in a stack in this order and are deleted one at a time, then what is the order of removal?

(a) *ABCD*

(b) *DCBA*

(c) *DCAB*

(d) *ABDC*

80. The value of $\Gamma\left(\frac{1}{2}\right)$ is

(a) π

(b) $\frac{\pi}{2}$

(c) $\sqrt{\pi}$

(d) $\sqrt{\frac{\pi}{2}}$

81. If $x(x-y)dy + y^2dx = 0$, assume c is a constant, the solution of the differential equation is

(a) $y = ce^{y/x}$

(b) $y = ce^{x/y}$

(c) $y = ce^{1/x}$

(d) $y = cxe^{y/x}$

82. The number of significant digits in the number 524·020150 is

(a) 5

(b) 6

(c) 8

(d) 9

83. A convergent sequence has only

(a) one limit

(b) two limits

(c) three limits

(d) None of the above

84. Operation carried out by a NOT gate is also said to be

(a) inverting

(b) converting

(c) reverting

(d) reversing

85. *A* is 3 years older to *B* and 3 years younger to *C*, while *B* and *D* are twins. How many years older is *C* to *D*?

(a) 2

(b) 3

(c) 6

(d) 12

86. **Statements** : All mangoes are golden in colour. No golden-coloured things are cheap.

Conclusions :

I. All mangoes are cheap.

II. Golden-coloured mangoes are not cheap.

Which of the above Conclusions logically follow(s) from the two given Statements, disregarding commonly known facts?

(a) Only Conclusion I follows

(b) Only Conclusion II follows

(c) Neither I nor II follows

(d) Both I and II follow

87. An eigenvector corresponding to the eigenvalue $\lambda = 2$ for the matrix $A = \begin{pmatrix} 5 & 3 \\ 2 & 4 \end{pmatrix}$ is

(a) $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$

(b) $\begin{pmatrix} 3 \\ -2 \end{pmatrix}$

(c) $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$

(d) $\begin{pmatrix} 1 \\ 1 \end{pmatrix}$

88. If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x + y}\right)$, then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y}$ is

(a) $\sin u$

(b) $\sin 2u$

(c) $\cos u$

(d) $\cos 2u$

89. Which of the following is ***not*** a leap year?

(a) 700

(b) 800

(c) 1200

(d) 2000

90. If integers need two bytes of storage, then maximum value of an unsigned integer is

(a) $2^{16} - 1$

(b) $2^{15} - 1$

(c) 2^{15}

(d) 2^{16}

91. If the circle $x^2 + y^2 + 2x + 2ky + 6 = 0$ and $x^2 + y^2 + 2ky + k = 0$ intersect orthogonally, then k is

(a) 2 or $-3/2$

(b) -2 or $-3/2$

(c) 2 or $3/2$

(d) -2 or $3/2$

92. Let

$$f(x) = x^2 + \frac{x^2}{(1+x^2)} + \frac{x^2}{(1+x^2)^2} + \cdots + \frac{x^2}{(1+x^2)^n} + \cdots$$

then at $x = 0$

(a) $\lim_{x \to 0} f(x)$ does not exist

(b) $\lim_{x \to 0} f(x)$ exists but f is not continuous

(c) f is continuous

(d) None of the above

93. What number should come last in the series 8, 6, 9, 23, 87, ____?

(a) 128

(b) 226

(c) 324

(d) 429

94. If $a\cos\theta + b\sin\theta = m$ and $a\cos\theta - b\sin\theta = n$, then $m^2 + n^2$ is equal to

(a) $(ab)^2$

(b) $a^2 + b^2$

(c) 1

(d) $(a + b)^2$

95. See the following statements :

Class A has a higher enrollment than Class B.

Class C has a lower enrollment than Class B.

Class A has a lower enrollment than Class C.

If the first two statements are true, the third statement is

(a) true

(b) false

(c) uncertain

(d) None of the above

96. The sequence $\left(\frac{(-1)^n}{n}\right)$ is

(a) convergent

(b) unbounded

(c) divergent

(d) bounded

97. What is the angle of elevation of the sun, when the length of the shadow of a tree is 3 times the height of the tree?

(a) 30°

(b) 45°

(c) 60°

(d) 90°

98. Two numbers are in the ratio 3 : 5. If 9 is subtracted from each, the new numbers are in the ratio 12 : 23. The smaller number is

(a) 27

(b) 33

(c) 49

(d) 52

99. What is the smallest positive integer n for which $\left(\frac{1+i}{1-i}\right)^n = 1$, where $i^2 = -1$?

(a) 2

(b) 3

(c) 4

(d) 5

100. The matrix

$$\begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 1 & 4 \end{pmatrix}$$

satisfies which one of the following properties?

(a) Symmetric

(b) Orthogonal

(c) Invertible

(d) Singular