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JNU – 2019

Objective Type Questions (Only one option is correct)

1. In C language, the memory can be allocated to a variable var at compile time by using
 (a) malloc (var) (b) calloc (var) (c) realloc (var)
 (d) declaring var with appropriate type
2. The COUNT function in SQL return the number of
 (a) Values (b) Distinct rows (c) Distinct values (d) Distinct groups
3. The function $(p \vee (r \vee q)) \wedge \sim (\sim q \wedge \sim r)$ is equal to the function
 (a) $q \vee r$ (b) $((p \vee r) \vee q) \wedge (p \vee r)$ (c) $(p \wedge q) \vee (p \wedge r)$ (d) $(p \vee q) \wedge \sim (p \vee r)$
4. The value of the series $\sum \frac{1}{n^2}$ is
 (a) $\frac{\pi^2}{3}$ (b) $\frac{\pi^2}{4}$ (c) $\frac{\pi^2}{5}$ (d) $\frac{\pi^2}{6}$
5. The bitwise operator that can be help make '0' as '1' of a particular bit in a number in C
 (a) && (b) & (c) | (d) ||
6. An array of five pointers to integer is declared by
 (a) `int *ptr[5]();` (b) `int *ptr[5];` (c) `int (*ptr[5])();` (d) `int **ptr[5];`
7. $\cos(\tan^{-1}(\sin(\cot^{-1}(x))))$ is
 (a) $\sqrt{\frac{1+x^2}{2+x^2}}$ (b) $\sqrt{\frac{1-x^2}{2+x^2}}$ (c) $\sqrt{\frac{1+x^2}{4+x^2}}$ (d) $\sqrt{\frac{x^2-1}{x^2-2}}$
8. The determinant $\begin{vmatrix} 1 & 5 & 3 \\ 1 & 10 & 6 \\ 1 & 15 & 9 \end{vmatrix}$ is
 (a) 0 (b) 3 (c) 5 (d) 6
9. In a cyclic group, the following is not correct
 (a) It must have some generator (b) It must be abelian
 (c) There is no relation among the element (d) Generator need not be unique

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10. **A.** The product of two even permutations is even.
B. The product of two odd permutations is odd.
 (a) Statement A is true
 (b) Statement B is true
 (c) Both statement A and B are true
 (d) Both statements A and B are false
11. When a monkey's baby was 30 days old, it started eating banana and ate banana. Its appetite grew and each day it ate $\frac{3}{2}$ times of the previous day. How old will it be when it can eat at least five bananas?
 (a) 32 (b) 34 (c) 38 (d) 40
12. Define R, a relation, on $N \times N$: for all a, b, x, y in N, (a, b)R (x, y) iff $ay = bx$. Which is true?
 (a) R is reflexive only (b) R is symmetric only (c) R is transitive only (d) All are true
13. Page stealing is related to
 (a) an efficient system (b) taking page frames from other working set
 (c) tuning the goal (d) taking larger space from the disk space for
14. Let f be a mapping from A to B, where A and B are non-empty sets. The f is a function only if
 (a) it is one-one
 (b) it is onto
 (c) all elements in B are associated with some element(s) of A
 (d) None of these
15. The matrix $\begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & 3 \\ 1 & 1 & 4 \end{pmatrix}$ satisfies which one of the following properties?
 (a) Symmetric (b) orthogonal (c) invertible (d) singular
16. The value of the $\int_0^{\infty} \frac{\sin^2 x}{x^2} dx$ is
 (a) $\log_e \pi$ (b) $\frac{\pi}{4}$ (c) $\log_e 2$ (d) $\frac{\pi}{2}$
17. $(1110.01)_2$ is
 (a) $(14.25)_{10}$ (b) $(12.75)_{10}$ (c) $(13.25)_{10}$ (d) $(14.75)_{10}$
18. In a gathering of students, the probability of a student having tea is 0.5, that of a student having coffee is 0.7 and that of a student having neither tea nor coffee is 0.1. What is the probability of a student having both tea and coffee?
 (a) 0.1 (b) 0.3 (c) 0.4 (d) 0.5
19. Which of the following is a group?
 (a) Real numbers under multiplication (b) Positive real numbers under multiplication

- (c) Real $n \times n$ matrices under multiplication (d) Integers under multiplication
20. Let α, β be the roots of polynomial $f(x) = 2x^2 - 7x + 4$. The value of difference of the roots $|\alpha - \beta|$ is
 (a) $17/2$ (b) 17 (c) $\sqrt{17}/2$ (d) $\sqrt{17}$
21. The quick sort method in average case has the order
 (a) $O(n)$ (b) $O(n^2)$ (c) $O(n \log_2 n)$ (d) $O(n^2 - 1)$
22. How many different committees of 3 people consisting of 2 men and 1 women can be made from a group consisting of 10 men and 7 women?
 (a) 630 (b) 315 (c) 70 (d) None of these
23. Which is not true about $s_n = \frac{1}{n}$?
 (a) sequence converges to 0 (b) $\limsup s_n = 0$
 (c) $\lim_{n \rightarrow \infty} \sum_{i=1}^n s_i = L$ (d) series $\sum s_n^2$ converges
24. The data structure used to hold a node in breath-first search in a graph is
 (a) tree (b) array (c) queue (d) stack
25. The next term in the series in RLDR, SMCQ, TNBP,
 (a) UOAO (b) VOKO (c) OKPR (d) WPST
26. The value of integral $\int_0^{\infty} \frac{x^{n+1}}{n+1} dx$, for $0 < n < 1$, is
 (a) $\frac{\pi}{\cot nx}$ (b) $\frac{\pi}{\cos nx}$ (c) $\frac{\pi}{\tan nx}$ (d) $\frac{\pi}{\sin nx}$
27. The method of computing the roots of polynomial equations have order of convergence in the order
 (a) Bisection method > secant method > Newton method
 (b) Secant method > Bisection method > Newton method
 (c) Newton method > Secant method > Bisection method
 (d) Secant method > Newton method > Bisection method
28. For the curve $xy = \sqrt{x^2 + y^2}$, slope $\frac{dy}{dx}$ at any point is given by
 (a) $\frac{x(1-y^2)}{y(1-x^2)}$ (b) $-\frac{x(1-y^2)}{y(1-x^2)}$ (c) $\frac{1-y^2}{1-x^2}$ (d) $-\frac{1-y^2}{1-x^2}$
29. If 'RIST' is written as '7614' and 'MTAL' is written as '5423'. Then, 'RAIL' written in the code as
 (a) 5429 (b) 7124 (c) 7263 (d) 6412
30. If $3^x \cdot 3^y \cdot 3^z = 81$, then $x^2 + y^2 + z^2 + 2xy + 2yz + 2zx$ will be

42. The remainder obtained after $x^4 + x^2 + x + 1$ is divided by $x^2 + x + 1$ is
 (a) 1 (b) x (c) $x + 1$ (d) None of these
43. $\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ is
 (a) $2 \tan^{-1}(x)$ (b) $6 \tan^{-1}(x)$ (c) $\sec^{-1}(x)$ (d) $3 \cot^{-1}(x)$
44. Which is ODD word?
 (a) Centimeter (b) Inch (c) Yard (d) Kiloliter
45. A rectangular vessel of size $2 \text{ cm} \times 5 \text{ cm} \times 8 \text{ cm}$ full of water is emptied to a cylindrical container having the base diameter is 8 cm . Its height will be
 (a) $\frac{5}{\pi}$ (b) $\frac{15}{\pi}$ (c) $\frac{10}{\pi}$ (d) 20
46. $\sin^{-1}(x) + \sin^{-1}(\sqrt{1-x^2})$ is
 (a) $\frac{\pi}{3}$ (b) $\frac{\pi}{2}$ (c) $\frac{\pi}{4}$ (d) 1
47. Which is the most appropriate word for '?' ?
 Banana Fruit Market
 Novels ? Book store
 (a) Vegetable (b) Shopping (c) Story (d) Book
48. Let (G, o) be a group such that for all a, b in G , $aob = a + b - 3$. The identity element of this group is
 (a) -3 (b) 2 (c) 3 (d) 1
49. Let S be a string 1's and 0's that is recursively defined as follows.
 i. $1 \in S, 100 \in S$
 ii. If $s \in S$, then $1s \in S$
 iii. If $s \in S$, then $00s \in S$
 iv. Nothing but strings generated as per rules 1, 2 and 3 are elements in S .
 The following is not an element of S
 (a) 001 (b) 1100111 (c) 001100001 (d) 101100001
50. A digital system does not have a discrete element
 (a) Electric digits (b) Decimal digits (c) Arithmetic operations (d) Digital counters
51. If three cows graze the grass of a ground in eight days, how many cows can eat that grass in two days?
 (a) 6 (b) 9 (c) 12 (d) 15
52. Given that $x = -2$ is a root of the polynomial $f(x) = x^3 - 19x - 30$, which of these is another root of $f(x)$?
 (a) 3 (b) 7 (c) 12 (d) 5

53. The attributes in an E – R diagram are represented by
 (a) Circle (b) Ellipse (c) Triangle (d) Rectangle
54. The next term in the series 0, 1, 1, 2, 4, 17, 13,
 (a) 24 (b) 18 (c) 20 (d) 22
55. Fragmentation in a file system
 (a) occurs in file system is not used properly (b) can always be prevented
 (c) can temporarily be removed by compaction (d) can be removed by deleting temporary file
56. A taxi car needs to go from city A to city B, which are 300 km apart. It covers one third of this distance at the speed 100 km/h, one fifth of the remaining in 2 hours and the rest of the distance at the speed of 80 km/h. The average speed of the taxi car is
 (a) 90 km/h (b) 80 km/h (c) 70 km/h (d) 60 km/h
57. The distance of the point P(5, 2) to the line passing through (1, 4) and (4, 0) is
 (a) 2 (b) 5 (c) 8 (d) 10
58. The average of three numbers a, b and z is $(a + b) - ab$. Then z will be
 (a) $(a + b)/ab - 3ab$ (b) $2(a + b) - 3ab$ (c) $3(a + b) - ab$ (d) $3(a + b) - 3ab$
59. `#include<stdio.h>`
`int main()`
`{`
`FILE*fp, *fq, *fr;`
`fp = fopen("file1.c", "r");`
`fq=fopen("file2.c", "r");`
`fr=fopen("file3.c", "r");`
`fclose(fp, fq, fr);`
`return 0;`
`}`
 The files can be closed using `fclose()` in this program is
 (a) file1.c, file2.c, file3.c (b) file1.c, file2.c (c) file1.c (d) none of them
60. Mohan walks 5 cm towards right, takes a left turn and walks 10cm again. He then takes another left turn and walks 15cm. He then takes a final left turn and walks 10cm before stopping. He is from the starting point at the distance of
 (a) 20 cm (b) 15 cm (c) 10 cm (d) 5 cm
61. The operation that makes a transaction permanent in database is
 (a) View (b) Commit (c) Rollback (d) Flashback
62. The magnitude of the vector (4, -3, 2) is
 (a) 5 (b) 6 (c) 8 (d) $\sqrt{29}$
63. Which word is ODD among the following?
 (a) Seat (b) Steering wheel (c) Wiper (d) Car

64. The cardinality of the set $S = \left\{ \frac{p}{q} \mid p, q \in \mathbb{N}^*, p, q \leq 10 \right\}$ is
 (a) 55 (b) 57 (c) 60 (d) None of these
65. In a relational model, a relation is considered as a
 (a) Table (b) Tuple (c) Attribute (d) Row
66. A fair coin is tossed successively four times. What is the probability exactly three heads?
 (a) $\frac{1}{4}$ (b) $\frac{3}{4}$ (c) $\frac{7}{8}$ (d) 1
67. A critical section must have the number of processes to avoid the race condition
 (a) 0 (b) 1 (c) 2 (d) 3
68. What is the maximum value of the integral $\int_a^b (9 - x^2) dx$ over all possible real numbers a, b satisfying the condition $a \leq b$?
 (a) 3 (b) 6 (c) 36 (d) 54
69. The indefinite integral $\int x 2^x dx$ equals
 (a) $(x - 1)2^x / \ln(2)$ (b) $(x \ln(2) - 1)2^x / \ln(2)^2$ (c) $\ln(2)$ (d) $(x \ln(2) - 1)2^x / \ln(2)$
70. The equation of plane passing through the points (2, 3, -4) and (1, -1, 3) and parallel to x-axis is
 (a) $7y + 4z = 5$ (b) $2y + z = 11$ (c) $y - 2z = -7$ (d) $4y + 2z = 2$
71. The value of $\lim_{n \rightarrow \infty} \frac{\tan x}{x}$ is
 (a) 1 (b) 0 (c) -1 (d) Does not exist
72. The vector A and B are perpendicular if
 (a) $A \cdot B = 1$ (b) $A \cdot B = 0$ (c) $A \times B = 1$ (d) $A \times B = 0$
73. The non-linear data structure is
 (a) stack (b) array (c) strings (d) trees
74. The eigen values of $\begin{pmatrix} 5 & 1 \\ -1 & 3 \end{pmatrix}$ are
 (a) 4, 4 (b) 5, 3 (c) 1, -1 (d) 4, -4
75. The value for '?' is

25	10	15
36	12	24
49	?	42

 (a) 14 (b) 22 (c) 7 (d) 18
76. Let $y\sqrt{x^2 + a^2} = \log(\sqrt{x^2 + a^2} - x)$ for some constant a. Then the derivative $\frac{dy}{dx}$ is

$$(a) \frac{xy+1}{x^2+a^2} \quad (b) -\frac{xy+1}{x^2+a^2} \quad (c) \frac{xy+1}{\sqrt{x^2+a^2}} \quad (d) -\frac{xy+1}{\sqrt{x^2+a^2}}$$

77. Inter process communication on (IPC) is needed
 (a) to execute a process (b) to execute all process
 (c) to communicate to different processes (d) to allow processes synchronize and activity
78. The dot product of vectors $(2, -5, 1)$ and $(-4, 1, 7)$ is
 (a) 7 (b) 5 (c) -6 (d) -8
79. The centroid of the triangle $A(0, 3), B(4, 0), C(5, 3)$ is
 (a) $\left(\frac{9}{2}, 3\right)$ (b) $(3, 2)$ (c) $(4, 5)$ (d) $(3, 4)$
80. The point that divides the line segment of the point $(5, -2, 1)$ and $(3, 5, -5)$ in the ratio 1 : 3 externally is
 (a) $\left(3, -5, -\frac{1}{2}\right)$ (b) $\left(\frac{9}{2}, -\frac{1}{2}, -\frac{1}{2}\right)$ (c) $(6, -5, 4)$ (d) $\left(6, -\frac{1}{2}, 4\right)$
81. There are 100 students in a class out which 70 study Mathematics, 80 English. How many students do study both Mathematics and English?
 (a) 20 (b) 30 (c) 40 (d) 50
82. If $f(x) = \frac{1}{1-x}$, then $f(f(f(x)))$ is
 (a) $\frac{1}{(1-x)^2}$ (b) $(x-1)^2$ (c) x (d) x^3
83. The 9's complement of 325800 is
 (a) 674199 (b) 773299 (c) 684389 (d) 696789
84. Let $f(x) = ax^2 + bx + c$ be a polynomial that takes both positive and negative values as x varies over all real numbers. 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) $bc > (2a)^2$
85. The value of the integral $\int_0^\infty x^{n-1} e^{-x} dx$, n is a positive integer, is
 (a) $n!$ (b) $\frac{e}{n!}$ (c) e^{-1} (d) e^{-2}
86. Consider the statement, "Either $-2 \leq x \leq -1$ or $1 \leq x \leq 2$ "
 (a) $x < -2$ or $2 < x$ or $-1 < x < 1$ (b) $x < -2$ or $2 < x$
 (c) $-2 < x < 2$ (d) $x \leq -2$ or $2 \leq x$ or $-1 < x < 1$
87. Thrashing is sometime necessary, but it does not execute a given process. It can be avoided
 (a) By keeping pages of the working set of the programs in main memory
 (b) Increasing the CPU speed (c) increasing I/O processor speed (d) All of them

88. Which function is not uniformly continuous on $(0, 1)$?
- (a) x^2 (b) $\frac{1}{x^2}$ (c) $\sin x$ (d) $\frac{\sin x}{x}$
89. The most relevant word to knowledge is
- (a) School (b) Book (c) Teacher (d) Learning
90. Let $[x]$ denotes the greatest integer function of x . What is the value of the integral $\int_{1/2}^1 [2x^2 + x] dx$?
- (a) $\frac{23}{24}$ (b) $\frac{(7 - \sqrt{17})}{4}$ (c) $\frac{(-1 + \sqrt{17})}{4}$ (d) $\frac{(7 + \sqrt{17})}{4}$
91. A student gets a Bachelor Degree only after passing all the written test papers and submitting the assignments. Out of 200 students, 150 passed all their written papers and 160 submitted their assignments. How many students did get their Bachelor Degree?
- (a) At least 110 (b) Exactly 160 (c) At least 14 (d) At least 150
92. A list in which the pointer points to a next node is called
- (a) Single linked list (b) double linked list (c) circular linked list (d) Array of pointers
93. Hammer is to Ironsmith. Pen is to
- (a) Author (b) Writer (c) Student (d) Teacher
94. The value of integral $\int_0^{\pi/2} \log \sin x dx$ is
- (a) $\log_e 2$ (b) $\frac{\pi}{n!}$ (c) $\frac{\pi}{2} \log_e 2$ (d) $\log_e \pi$
95. Parity bit helps in
- (a) Finding error of multiple bits (b) Correcting of multiple bits
(c) Both (d) none of them
96. An Eigen vector corresponding to the Eigen value $\lambda = 8$ for matrix $A = \begin{pmatrix} 7 & 3 \\ 2 & 2 \end{pmatrix}$ is
- (a) $\begin{pmatrix} 3 \\ 1 \end{pmatrix}$ (b) $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ (c) $\begin{pmatrix} -1 \\ 2 \end{pmatrix}$ (d) $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$
97. The value of integral $\int_0^{\infty} \frac{\sin ax}{x} dx, a > 0$ is
- (a) $\frac{\pi}{2}$ (b) π (c) $\log_e 2$ (d) $\log_e \pi$
98. The next term of the series is 6, 5, 24, 25, 144,
- (a) 160 (b) 165 (c) 170 (d) 175
99. Consider the function $f(x) = 3x - 7$. The f^2 is given by
- (a) $9x - 28$ (b) $9x^2 - 42x + 49$ (c) $6x - 14$ (d) $9x^2 - 49$

100. The eccentricity of ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

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

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

(c) $\sqrt{1 - \frac{b^2}{a^2}}$

(d) $\sqrt{1 + \frac{a^2}{b^2}}$

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