

P.G./INTEGRATED P.G. ENTRANCE EXAMINATION, APRIL 2023**COMPUTER SCIENCE**

Time : Two Hours

Maximum : 400 Marks

Part 1**Computer Science.***Each question carries 4 marks.**1 mark will be deducted for each wrong answer.*

1. Which of the following is the smallest unit of data in computer ?
(A) Nibble. (B) Byte.
(C) Bit. (D) Byte.
2. Computers can be classified to... generations :
(A) 3. (B) 6.
(C) 4. (D) 5.
3. Choose the correct sequence :
(A) KB - TB - GB - MB. (B) KB - MB - GB - TB.
(C) KB - GB - MB - TB. (D) MB - KB - TB - GB.
4. Second generation computers are made of _____.
(A) LSI. (B) SLSI.
(C) Vacuum tubes. (D) Transistors.
5. _____ is the fastest memory.
(A) Cache memory. (B) Main memory.
(C) Registers. (D) Secondary memory.
6. Radix of octal number system is :
(A) 4. (B) 7.
(C) 8. (D) 80.

Turn over

7. _____ Is an example for language translator.
- (A) Compiler. (B) Interpreter.
(C) Assembler. (D) All of these.
8. Expand UPS :
- (A) Uninterrupted power supply. (B) Uniform power supply.
(C) Universal power supply. (D) United power supply.
9. Trackball is an output device :
- (A) False.
(B) True.
10. _____ byte is called nibble.
- (A) 2. (B) 1024.
(C) ½. (D) 8.
11. In a synchronous modem, the receive equalizer is known as :
- (A) Adaptive equalizer. (B) Impairment equalizer.
(C) Statistical equalizer. (D) Compromise equalizer.
(E) None of the above.
12. Which of the following best describes the scopes on each DHCP server, in the absence of configuration problems with DHCP addresses, if you use multiple DHCP servers in your environment ?
- (A) Unique to that subnet only. (B) For different subnets.
(C) For no more than two subnets. (D) For no subnets.
(E) None of the above.
13. Which file transfer protocol uses UDP ?
- (A) NFS. (B) TELNET.
(C) TFTP. (D) FTP.
(E) None of the above.

14. You are working with a class C network. You are required to configure it for five subnets, each of which will support 25 nodes. What subnet should you use ?
- (A) 255.255.255.0. (B) 255.255.255.224.
(C) 255.255.255.240. (D) 255.255.255.248.
(E) 255.255.255.252.
15. Which of the following medium access control technique is used for bus/tree ?
- (A) Token ring. (B) Token bus.
(C) CSMA. (D) MAC.
(E) None of the above.
16. A batch processing terminal would not include a :
- (A) CPU. (B) Card reader.
(C) Card punch. (D) Line printer.
(E) None of the above.
17. The physical layer of a network :
- (A) Defines the electrical characteristics of signals passed between the computer and communication devices.
(B) Controls error detection and correction.
(C) Constructs packets of data and sends them across the network.
(D) All of the above.
(E) None of the above..
18. Which of the following allows devices on one network to communicate with devices on another network ?
- (A) Multiplexer. (B) Gateway.
(C) t-switch. (D) Modern.
(E) None of the above.

Turn over

19. The _____ layer is the layer closest to the transmission medium.
- (A) Transport. (B) Network.
(C) Data link. (D) Physical.
(E) None of the above.
20. In a _____ topology, if there are n devices in a network, each device has $n - 1$ ports for cables.
- (A) Ring. (B) Bus.
(C) Star. (D) Mesh.
21. The program that translates your code from a high-level language to the binary language is called _____.
- (A) Compiler. (B) Programmer.
(C) Translator. (D) Linker.
22. Which data type is most appropriate for storing the value 57,000 in a 32-bit system?
- (A) Signed short. (B) Unsigned short.
(C) Long. (D) Int.
23. What is a String in C?
- (A) Char variable. (B) An array of char
(C) An array of int. (D) An array of long.
24. When a double is converted to a float, its value is _____?
- (A) Rounded. (B) Truncated.
(C) Depends on compiler. (D) Depends on the standard.
25. Identify the wrong statement :
- (A) `Putchar(65)`. (B) `Putchar('x')`.
(C) `Putchar("x")`. (D) `Putchar(')`.

26. The output of the following code is :

```
void main()
{
    int a;
    int &b = a;
    a=100;
    printf("b=%d\ta=%d
", b,a)
}
```

(A) b=100 a=100.

(B) b=100 a=0.

(C) b=0 a=100.

(D) Error.

27. Unsigned char has a range from 0 to :

(A) 253.

(B) 254.

(C) 255.

(D) 256.

8. Prototype of a function means _____.

(A) Name of Function.

(B) Output of Function.

(C) Declaration of Function.

(D) Input of a Function.

29. If the function returns no value then it is called _____.

(A) Data type function.

(B) Calling function.

(C) Main function.

(D) Void function.

30. How many times will the following loop execute ?

```
for(j = 1; j <= 10; j = j-1)
```

(a) Forever.

(b) Never.

(c) 0.

(d) 1.

Turn over

31. In a one-to-many relationship of a table, 'many' side is called :
- (A) Parent. (B) Child.
(C) Sister. (D) Master.
32. A data dictionary is a repository that manages _____.
- (A) Memory. (B) Metadata.
(C) Spell Checker. (D) Data Validator.
33. Which one is preserved in execution of transaction in isolation ?
- (A) Durability. (B) Consistency.
(C) Atomicity. (D) Isolation.
34. External database is :
- (A) Database created using DBMS package.
(B) Database created in MS-Word.
(C) Database created in EXCEL.
(D) All of the above.
35. The _____ operation allows the combining of two relations by merging pairs of tuples, one from each relation, into a single tuple.
- (A) Intersection. (B) Union.
(C) Join. (D) Select.
36. Which of the following data types can be integer, float, double precision, data etc., ?
- (A) Numeric. (B) Enumerated.
(C) Primitive. (D) User defined.
37. Data independency in DBMS is known as _____.
- (A) Data modeling. (B) Data hiding.
(C) Data consistency. (D) Data capturing.
38. In E-R diagram, relationship is represented by :
- (A) Diamond shaped. (B) Dashed shaped.
(C) Ellipse shaped. (D) Rectangle shaped.

39. Collecting personal information and **effectively** posing as another individual is known as the crime of _____.
- (A) Spooling. (B) Identity theft.
(C) Hacking. (D) Spoofing.
40. _____ is one of the reasons for problems of data integrity.
- (A) Data redundancy.
(B) Security constraints.
(C) Data inconsistency.
(D) Data availability constraints.
41. All the users of the system who are not **members** of a project group are referred to as :
- (A) Group users. (B) File owner.
(C) Group owner. (D) Other users.
42. Which kind of hardware is used the **most in the** input phase of a computer based information system ?
- (A) Hard disk. (B) Monitor.
(C) Printer. (D) Keyboard.
43. Digitizing the coordinate values of a **continuous** image is called :
- (A) Compression. (B) Quantization.
(C) Sampling. (D) Segmentation.
44. Linear analysis is called _____ in a compiler.
- (A) Lexical analysis. (B) Scanning.
(C) Testing. (D) Both (a) and (b).
45. What is the name given to the weapons which use computerized guidance system ?
- (A) Starwars weapons. (B) Dumb weapons.
(C) Smart weapons. (D) Guided weapons.

Turn over

46. Which of the following(s) is/are the characteristic(s) of UNIX ?
- (A) Multi user. (B) Multi tasking.
(C) Kernel Manages data. (D) All of these.
47. Additive, Multiplicative, shift, Bitwise logical and assignment operators is _____ operator.
- (A) Conditional. (B) Relational.
(C) Unary. (D) Binary.
48. If a binary tree satisfies shape and order property, it is known as :
- (A) Rooted tree. (B) Heap.
(C) Sequential search tree. (D) Binary search tree.
49. The blinking on and off of characters on a VDU screen is :
- (A) Flicker. (B) Flag.
(C) Flashing. (D) Flat bed plotter.
50. What is the abbreviation of HTML ?
- (A) Hyper Text Markup Language. (B) Hyper Tag Markup Language.
(C) Hyper Text Main Language. (D) Hyper Tag Main Language.

Part II

(a) Electronics.

51. The greatest negative number which can be stored in 8-bit computer using 2's complement arithmetic is _____.
- (A) - 128. (B) 128.
(C) 256. (D) - 256.
52. Which general purpose register holds eight-bit divisor and store the remainder especially after the execution of division operation ?
- (A) Registers R3 through R5. (B) A-Register.
(C) B-Register. (D) Both A and B Register.

53. How does the processor respond to an occurrence of the interrupt ?
- (A) By Interrupt Status Subroutine.
 - (B) By Interrupt Structure Subroutine.
 - (C) By Interrupt System Subroutine.
 - (D) By Interrupt Service Subroutine.
54. While coupling of LEDs with fibre, on which factor does the size of source and lighting angle generated within the semiconductor depend ?
- (A) Geometry of die.
 - (B) Refractive index of semiconductor.
 - (C) Encapsulation Medium.
 - (D) All of the above.
55. The output signal is fed back at the input side from the _____ point.
- (A) Summing.
 - (B) Take-off
 - (C) Differential.
 - (D) All of the above
56. The load impedance Z_L of a CE amplifier has R and L in series. The phase difference between output and input will be _____.
- (A) 180° .
 - (B) More than 180° but less than 270° .
 - (C) 0.
 - (D) More than 90° but less than 180° .
57. In an LC oscillator, the frequency of oscillator is _____ L or C.
- (A) Proportional to square of.
 - (B) Inversely proportional to square root of.
 - (C) Directly proportional to.
 - (D) Independent of the values of.

Turn over

58. _____ cannot be fabricated on an IC :
- (A) Large inductors and transformers.
 - (B) Diodes.
 - (C) Transistors.
 - (D) Resistors.
59. Which type of networks allow the physical separability of the network elements for analysis purpose ?
- (A) Distributed Networks.
 - (B) Unilateral Networks.
 - (C) Lumped Networks.
 - (D) Bilateral Networks.
60. What is the total resistance of a voltmeter on the 10 V range when the meter movement is rated for 50 μ A of full-scale current ?
- (A) 10 k Ω .
 - (B) 200 k Ω .
 - (C) 20 k Ω .
 - (D) None of the above.

(b) Physics

61. If electrical conductivity increases with the increase of temperature of a substance, then it is a :
- (A) Conductor.
 - (B) Semiconductor.
 - (C) Insulator.
 - (D) Carborator.
62. Which law is also called the law of inertia ?
- (A) Newton's Second law.
 - (B) Newton's First Law.
 - (C) Newton's Third Law.
 - (D) All of these.
63. A cyclist moves along a circular path of radius 70m. If he completes one round in 11s, calculate the total length of a path.
- (A) 440 m.
 - (B) 40 m.
 - (C) 0 m.
 - (D) 11 m.

64. What is the minimum number of coplanar vectors of different magnitudes which can give zero resultant?
- (A) One. (B) Two.
(C) Three. (D) Four.
65. In a SHM, for what value of w , will the magnitude of maximum acceleration be greater than the magnitude of maximum velocity? Here, w is angular frequency.
- (A) $w > 1$.
(B) $w < 1$.
(C) $w = 0$.
(D) Not possible for any value of w .
66. The velocity of a car A is to $5\hat{i}$. The velocity of another car B is $22\hat{i} - 7\hat{j}$. What is the relative velocity of A with respect to B?
- (A) $-17\hat{i} + 7\hat{j}$. (B) $7\hat{i} + 17\hat{j}$.
(C) $-7\hat{i} + 17\hat{j}$. (D) $-17\hat{i} + 7\hat{j}$.
67. A person is standing in an elevator. In which situation he finds his weightless?
- (A) When the elevator moves upward with constant acceleration.
(B) When the elevator moves downward with constant acceleration.
(C) When the elevator moves upward with uniform velocity.
(D) When the elevator moves downward, with uniform velocity.
68. If the length of a simple pendulum is increased by 2%, then the time period _____.
- (A) Increases by 1%. (B) Decreases by 1%.
(C) Increases by 2%. (D) Decreases by 2%.
69. Which law states that, under the same conditions of temperature and pressure, equal volumes of all gas contains equal number of molecules.
- (A) Grahams law. (B) Colioli Effect.
(C) Pascal's Law. (D) Avogadro's Law.

Turn over

70. The speed of sound travel fastest through :

- (A) Solid. (B) Liquid.
(C) Gas. (D) None of the above.

(c) Mathematics

71. If A and B are symmetric matrices of the same order, then :

- (A) AB is a symmetric matrix.
(B) A - B is askew-symmetric matrix.
(C) AB + BA is a symmetric matrix.
(D) AB - BA is a symmetric matrix.

72. If A is a square matrix, then A - A' is a :

- (A) Diagonal matrix. (B) Skew-symmetric matrix.
(C) Symmetric matrix. (D) None of these.

73. If A is a square matrix, then A - A' is a :

- (A) Diagonal matrix. (B) Skew-symmetric matrix.
(C) Symmetric matrix. (D) None of these.

74. If A = diag (3, -1), then matrix A is :

(a) $\begin{bmatrix} 0 & 3 \\ 0 & -1 \end{bmatrix}$

(b) $\begin{bmatrix} -1 & 0 \\ 3 & 0 \end{bmatrix}$

(c) $\begin{bmatrix} 3 & 0 \\ 0 & -1 \end{bmatrix}$

(d) $\begin{bmatrix} 3 & -1 \\ 0 & 0 \end{bmatrix}$

75. The p^{th} derivative of a q^{th} degree monic polynomial, where p, q are positive integers and

$$2p^4 + 3pq \frac{3}{2} = 3q \frac{3}{2} + 2qp^3 \text{ is given by ?}$$

(A) Cannot be generally determined.

(b) $(q-1)!$.

(c) $(q)!$.

(d) $(q-1)! * p^q$.

76. At the point of discontinuity, sum of the series is equal to _____.
- (A) $12[f(x+0) - f(x-0)]$. (B) $12[f(x+0) + f(x-0)]$.
- (C) $14[f(x+0) - f(x-0)]$. (D) $14[f(x+0) + f(x-0)]$.
77. Find the directional derivative of $\phi = xy^2 + yz^3$ at $(1, -1, 1)$, towards the point $(2, 1, -1)$.
- (A) 53. (B) -53.
- (C) 73. (D) 13.
78. The unit normal vector n^{\wedge} of the cone of revolution $z^2 = 4(x^2 + y^2)$ at the Point P $(1, 0, 2)$ is ?
- (A) $[\pm 2/\sqrt{5}, 0, \mp 1/\sqrt{5}]$. (B) $[2/\sqrt{5}, 0, 1/\sqrt{5}]$.
- (C) $[-2/\sqrt{5}, 0, -1/\sqrt{5}]$. (D) $[\pm 2/\sqrt{5}, 0, \pm 1/\sqrt{5}]$.
79. Find $\partial z / \partial x$ where $Z = ax_2 + 2by_2 + 2bxy$:
- (A) $3by$. (B) $2ax$.
- (C) $3(ax + by)$. (D) $2(ax + by)$.
80. What is the order of the equation, $xy_3 (\partial y / \partial x)^2 + yx^2 + \partial y / \partial x = 0$?
- (A) Third Order. (B) Second Order.
- (C) First Order. (D) Zero Order.

(d) Statistics

81. The expectation of a random variable X ($E(X)$) can be written as _____.
- (A) $d/dt [MX(t)] (t=0)$. (B) $d/dx [MX(t)] (t=0)$.
- (C) $d_2/dt_2 [MX(t)] (t=0)$. (D) $d_2/dx_2 [MX(t)] (t=0)$.
82. What is the mean and variance for standard normal distribution ?
- (A) Mean is 0 and variance is 1.
- (B) Mean is 1 and variance is 0.
- (C) Mean is 0 and variance is ∞ .
- (D) Mean is ∞ and variance is 0.

Turn over

83. Find λ in Poisson's distribution if the probabilities of getting a head in biased coin toss as $\frac{3}{4}$ and 6 coins are tossed.
- (A) 3.5. (B) 4.5.
(C) 5.5. (D) 6.6.
84. Find the mean of tossing 8 coins.
- (A) 2. (B) 4.
(C) 8. (D) 1.
85. If 40% of boys opted for maths and 60% of girls opted for maths, then what is the probability that maths is chosen if half of the class's population is girls.
- (A) 0.5. (B) 0.6.
(C) 0.7. (D) 0.4.
86. Suppose 5 men out of 100 men and 10 women out of 250 women are colour blind, then find the total probability of colour blind people. (Assume that both men and women are in equal numbers.)
- (A) 0.45. (B) 0.045.
(C) 0.05. (D) 0.5.
87. Three companies A, B and C supply 25%, 35% and 40% of the notebooks to a school. Past experience shows that 5%, 4% and 2% of the notebooks produced by these companies are defective. If a notebook was found to be defective, what is the probability that the notebook was supplied by A?
- (A) $\frac{44}{69}$. (B) $\frac{25}{69}$.
(C) $\frac{13}{24}$. (D) $\frac{11}{24}$.
88. If ${}^{16}P_{r-1} : {}^{15}P_{r-1} = 16 : 7$ then find r .
- (A) 10. (B) 12.
(C) 7. (D) 8.
89. In a colony, there are 55 members. Every member posts a greeting card to all the members. How many greeting cards were posted by them?
- (A) 990. (B) 890.
(C) 2970. (D) 1980.

90. Find the sum of all four digit numbers that can be formed by the digits 1, 3, 5, 7, 9 without repetition.
- (A) 666700. (B) 666600.
(C) 678860. (D) 665500.
(e) Chemistry.

(e) Chemistry

91. Which one of the following exhibits rotational spectra ?
- (A) H_2 (B) Cl_2 .
(C) CO (D) CO_2 .
92. The order of polarity of NH_3 , NF_3 and BF_3 is :
- (A) $NF_3 < NH_3 < BF_3$. (B) $BF_3 < NF_3 < NH_3$.
(C) $BF_3 < NH_3 < NF_3$. (D) $NF_3 < BF_3 < NH_3$.
93. Select the pair with highest electronegativity difference
- (A) Li, F. (B) Na, Cl.
(C) Li, Br. (D) K, F.
94. Hybridisation of ClF_3 molecule is _____.
- (A) sp^3 . (B) sp^3d^2 .
(C) sp^3d . (D) sp^3d^3 .
95. The highest oxidation state is achieved by :
- (A) Cr. (B) V.
(C) Co. (D) Mn.
96. Neon lamps are used in botanical gardens and in green houses as they :
- (A) Provide better light. (B) Provide Oxygen.
(C) Stimulate growth of plants. (D) None of above.
97. Which has maximum ionization energy ?
- (A) Mg. (B) Mg^+ .
(C) Mg^{2+} . (D) All above have same level.

Turn over

98. Bond order of He molecule is :
- (A) 1. (B) 2.
(C) 3. (D) 0.
99. An aqueous solution of sucrose is :
- (A) Dextrorotatory and exhibit mutarotation.
(B) Laevorotatory and not exhibit mutarotation.
(C) Dextrorotatory and not exhibit mutarotation.
(D) Laevorotatory and exhibit mutarotation.
100. The Standard entropy of N_2 , O_2 and NO at 25 C are $210.45 \text{ JK}^{-1} \text{ mol}^{-1}$, $191.62 \text{ JK}^{-1} \text{ mol}^{-1}$ and $205.01 \text{ JK}^{-1} \text{ mol}^{-1}$ respectively. Calculate the standard entropy Change of the reaction.
- (A) 23.39 JK^{-1} . (B) 24.27 JK^{-1} .
(C) 25.17 JK^{-1} . (D) 22.66 JK^{-1} .