

Please read the following instructions carefully.

1. Fill in Roll No. and other personal details on OMR answersheet. Please sign in the designated space.
2. Do NOT open question paper booklet unless instructed.
3. Please note that calculators are not allowed.
4. No mobile devices, bluetooth devices and similar electronic communication devices are permitted.
5. Each question carries only one correct answer.
6. Please mark answers on the OMR sheet.
7. Use BLACK BALL POINT Pen for marking answers on OMR sheet. Gel pens/Ink pens are not allowed.
8. This examination has negative marking. Each incorrect question carries a penalty of -1/4 marks.
9. Please do not retain question paper booklet. Handover question paper booklet and OMR sheet to invigilator at end of examination.
10. You may keep copy of OMR answersheet for your reference.

Time: 2 Hours

Max. Marks: 100

Please note that each incorrect question carries a penalty of -1/4 marks.

Questions 1-5 are based on the following paragraphs.

It is not luck but labour that makes a man. Luck, says an American writer, is ever waiting for something to turn up; labour, with keen eyes and strong will, always turns up something. Luck lies in bed and wishes the postman would bring him news of a legacy; labour turns out at six and with busy pen and ringing hammer lays the foundation of competence. Luck whines, labour watches. Luck relies on chance, labour on character. Luck slips downwards to self-indulgence; labour strides upwards and aspires to independence. The conviction, therefore, is extending that diligence is the mother of good luck. In other words, that a man's success in life will be proportionate to his efforts, to his industry, to his attention to small things.

- 1 Which one of the following expressions in the passage indicates that the writer does not ultimately reject the element of luck? D
 - (A) 'Luck . . . is ever waiting'
 - (B) 'Luck whines'
 - (C) Luck . . . wishes the postman would bring him news'
 - (D) 'Diligence is the mother of good luck'
- 2 'Labour turns out at six and with busy pen and ringing hammer lays the foundation of competence.' What does this statement mean? A
 - (A) Hard work of all kinds makes people efficient.
 - (B) Labour lays the foundation of the building.
 - (C) The writer and the labourer are the true eyes of society.
 - (D) There is no worker who works so hard as the labourer who begins his day at six in the morning.
- 3 Which of the following is not the same in meaning as the word 'diligence', as used in the sentence? C
 - (A) Industriousness
 - (B) Heedfulness
 - (C) Promptness
 - (D) Meticulousness
- 4 Which one of the following statements sums up the meaning of the passage? B
 - (A) Luck is self-indulgent, but labour is selfless.
 - (B) Luck often ends in defeat, but labour produces luck.
 - (C) Luck waits without exertion, but labour exerts without waiting.
 - (D) Luck waits and complains without working while labour achieves success although it complains.
- 5 Which one of the following statements is true about the passage? D
 - (A) Luck is necessary for success.
 - (B) Success gives rise to more success.
 - (C) Expectation of good luck always brings disappointment.
 - (D) Success is exactly proportionate to hard work.

Questions 6-10 are based on the following paragraphs.

What distinguishes humans from animals? For some it is language, for others it is the altruistic willingness to help other members of the species. However, this kind of altruism seems to exist in the animal world also.

Researchers working with Chrisophe Boesch at the Max Planck Institute for Evolutionary Anthropology in Leipzig observed that West African chimpanzees adopt orphaned young, even though they are not related to them. Several animals lavished care on a juvenile for several years. Surprisingly, half of these adoptive parents were male.

This behavior is thought to be encouraged by the pressure of leopards, with whom the west African chimps share their habitat. The constant threat from the big cats seems to have encouraged cohesion and solidarity within the group. Accordingly, the scientists observed more chimp adoptions in west Africa's Tai National Park than in East Africa.

Wild chimps appear to be more prepared to help than those living in captivity. In zoos, chimps cooperate with other members of the group to only a very limited extent. Our observations show that altruism in wild chimps is much more widespread than studies of chimps in zoos would suggest, concludes Chrisophe Boesch.

- 6 About the recently discovered altruistic zeal in chimps, all except the following can be inferred from the passage: C
- (A) chimps living in the wild are more altruistic
 - (B) chimps adopt orphans that are unrelated to them
 - (C) chimps found in West African forests are more altruistic than found anywhere else.
 - (D) chimps found in Tai National Park are more altruistic than those found in East Africa
- 7 While discovering the adoptive streak in animals, what surprises the author is that: C
- (A) even chimps adopt orphan juveniles of big cats
 - (B) even big cats adopt orphans of chimps
 - (C) even male chimps adopt juveniles of other species
 - (D) even female chimps adopt juveniles of other species
- 8 In the expression "this behavior is thought to be encouraged" the word 'this' refers to- B
- (A) chimps are not much distinguished from humans
 - (B) chimps exhibit a sense of altruism existing in them
 - (C) chimps do not behave as strictly according to gender as humans
 - (D) gender limitations do not stop a male chimp from being altruistic and adoptive.
- 9 Which of the following is not a reason for altruistic behavior in West African chimps? A
- (A) the presence of natural sense of competition
 - (B) the presence of constant threat from leopards
 - (C) the presence of natural altruistic willingness to help others
 - (D) the presence of environment which stimulate such behaviour.

- 10 Which of the following does the author want to establish by suggesting that animals are altruistic? D
- (A) that humans are beginning to behave like animals
 - (B) that animals are beginning to behave like humans
 - (C) that humans are not so empathetic as animals are.
 - (D) that animals too, like humans, share empathy with fellow creatures

Questions 11-15 are based on the following paragraphs.

The greatest enemy of mankind, as people have discovered, is not science, but war. Science merely reflects the prevailing social forces. It is found that when there is peace, science is constructive; when there is war, science is perverted to destructive ends. The weapons which science gives us do not necessarily cause war, they make war increasingly terrible. Our main problem therefore, is not to curb science, but to stop war – to substitute law for force, and international government for anarchy in the relations of one nation with another. That is a job in which everybody must participate, including the scientists. We are now face to face with an urgent question – can education and tolerance, understanding and creative intelligence run fast and keep us abreast with our own mounting power to destroy? That is the question which we will have to answer one way or the other in this era. Science must help us in arriving at the answer, but the main decision lies within ourselves.

- 11 Which of the following is opposite in meaning as the word ‘anarchy’ used in the passage? D
- (A) Communal harmony
 - (B) Economic prosperity
 - (C) Law and order
 - (D) Political dominance
- 12 Which one of the following statements is not implied in the passage? D
- (A) People needlessly blame science for war
 - (B) Science is misused for destructive purposes
 - (C) The role of science in ensuring world peace is subsidiary to that of man
 - (D) Neither science, nor the weapons it invents adds to the horrors of war
- 13 Which of the following would be the most suitable title for the passage: C
- (A) Science and social forces
 - (B) Science and the horrors of war
 - (C) Science and world peace
 - (D) Science and the new generation
- 14 War can be stopped if C
- (A) Science is not allowed to lead us to utter destruction
 - (B) Science is restricted to be utilized only during war time
 - (C) We replace force and lawlessness by law and international government
 - (D) Weapons invented by science are not used to launch a war

- 15 According to the writer, the real enemy of mankind is not science but war, because D
- (A) Science merely invents the weapons with which war is fought
 - (B) Science during wars becomes destructive
 - (C) The weapons that science invents necessarily lead to war
 - (D) The weapons invented by science do not cause war, though these make it more destructive

Questions 16-20 are based on the following paragraphs.

The last half of my life was spent at one of those painful epochs of human history, during which the world seemed to be getting worse; where past victories which had seemed to be definitive have turned out to be only temporary. When I was young, Victorian optimism was taken for granted. It was thought that freedom and prosperity would spread gradually throughout the world through an orderly process, and it was hoped that cruelty, tyranny, and injustice would continually diminish. Hardly anyone was haunted by the fear of great wars. Hardly anyone thought of the nineteenth century as a brief interlude between past and future barbarism.

- 16 The victories of the past C
- (A) brought permanent peace and prosperity
 - (B) filled men with a sense of pessimism
 - (C) proved to be temporary events
 - (D) ended cruelty, tyranny and injustice
- 17 During the Victorian age people believed that C
- (A) Strife would increase
 - (B) There would be unlimited freedom
 - (C) Peace would prevail and happiness would engulf the whole world
 - (D) Wars would be fought on a bigger scale
- 18 The author felt sad about the latter part of his life because D
- (A) he was nostalgic about his childhood
 - (B) the world had not become prosperous
 - (C) the author had not won any further victories
 - (D) the world was painfully disturbed during that period of time
- 19 The phrase 'a brief interlude between past and future barbarism' can be interpreted as B
- (A) A short interlude between two great events
 - (B) A short period of time between past and future acts of savagery
 - (C) An interval between destructive wars
 - (D) A span of time between two progressive eras
- 20 The word 'definitive' used in the passage means B
- (A) defined
 - (B) final
 - (C) incomplete
 - (D) temporary

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- 21 A man moves in East direction for 200 m and then turns in North direction till he is at a distance of 250m from where he started. Distance covered in North direction is B
- (A) 200 m
(B) 150 m
(C) 100 m
(D) 50 m
- 22 A binary ripple counter is required to count up to 16383. How many flip-flops are required? D
- (A) 16382
(B) 8191
(C) 512
(D) 14
- 23 A 2-bit number X is represented by x_1x_0 (x_1 is most significant bit and x_0 is least significant bit. A comparator compares 2-bit inputs A and B; and outputs three signals G, L and E. Output G = 1 if $A > B$ else G = 0. Output L = 1 if $A < B$ else L = 0. Output E = 1, if $A = B$ else E = 0. D
- (A) $E = ((\text{NOT}(a_1 \text{ XOR } b_1)) \text{ OR } (\text{NOT}(a_0 \text{ XOR } b_0)))$
(B) $E = ((a_1 \text{ XOR } b_1) \text{ AND } (\text{NOT}(a_0 \text{ XOR } b_0)))$
(C) $E = ((\text{NOT}(a_1 \text{ XOR } b_1)) \text{ OR } (a_0 \text{ XOR } b_0))$
(D) $E = ((\text{NOT}(a_1 \text{ XOR } b_1)) \text{ AND } (\text{NOT}(a_0 \text{ XOR } b_0)))$
- 24 Consider a sequence sorted in descending order. Which one of the following operations shall result in an ascending order sequence in linear time D
- (A) partitioning using first element as pivot
(B) partitioning using any element as pivot
(C) partitioning using last element as pivot
(D) partitioning using mid element as pivot
- 25 Which is not true of the XML C
- (A) There can be only one root tag
(B) All elements must be properly nested within each other
(C) All tags must be in lower case
(D) All opening tags should be paired with the closing tag, unless it is an empty tag
- 26 Identify correct matching of the following sets. D
- | | |
|-------------------------|------------------------|
| (a) Transaction | (1) index |
| (b) Natural join | (2) relational algebra |
| (c) B-tree | (3) two phase locking |
| (d) Concurrency control | (4) ACID |
- (A) a-4, b-2, c-3, d-1
(B) a-4, b-1, c-3, d-2
(C) a-3, b-2, c-1, d-4
(D) a-4, b-2, c-1, d-3

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27 Match the terms in Column I to those in Column II

D

Column I	Column II
(A) Belady's Anomaly	(I) Degree of Multiprogramming
(B) Soft Link	(II) Semaphore
(C) Thrashing	(III) File
(D) Critical Section	(IV) FCFS

- (A) A – II, B – III, C – I, D - IV
(B) A – I, B – II, C – III, D - IV
(C) A – III, B – II, C – II, D - I
(D) A – IV, B – III, C – I, D – II

28 For which values of x, y and z, the following equations shall be satisfied

C

$$23_x + 32_y = 53_z$$

- (A) $x = 11, y = 5, z = 9$
(B) $x = 5, y = 9, z = 11$
(C) $x = 5, y = 11, z = 9$
(D) $x = 9, y = 11, z = 5$

29 Match the terms in Column I to those in Column II

B

Column I	Column II
(A) Stack	(I) Microprogram
(B) ALU	(II) Coherence
(C) Cache	(III) Procedure
(D) Control Unit	(IV) Comparator

- (A) A – I, B – II, C – III, D – IV
(B) A – III, B – IV, C – II, D – I
(C) A – I, B – III, C – II, D – IV
(D) A – I, B – IV, C – III, D – II

30 Multi-level Inheritance means:

A

- (A) Deriving a class from a derived class
(B) Deriving a class from single base class
(C) Deriving a class from multiple base classes
(D) none of the above

31 Two concurrent transactions T1 and T2 are in conflict when

B

- (A) T1 reads from x, T2 reads from y
(B) T1 reads from x, T2 writes to x
(C) T1 reads from x, T2 writes to y
(D) T1 writes to x, T2 writes to y

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- 32 $S \rightarrow (S)$
 $S \rightarrow a$ C
For above grammar, which of the following statements are true?
I The grammar is ambiguous.
II The grammar is suitable for top-down parsing.
III The grammar is suitable for bottom-up parsing.
(A) I and II
(B) I and III
(C) II and III
(D) I, II and III
- 33 In a class of 110, students are assigned roll number from 1 to 110. Of these students, all students whose roll numbers are divisible by 2 opt for Physics, whose roll numbers are divisible by 3 opt for Chemistry and those whose numbers are divisible by 5 opt for Math. Rest of the students opt for biology. Number of students in biology class are B
(A) 25
(B) 30
(C) 35
(D) 40
- 34 Which of the following conditions does not cause a deadlock? C
(A) Mutual Exclusion
(B) Hold and Wait
(C) Pre-emption
(D) Circular wait
- 35 A sequence of N operations are performed in random order on an initially empty stack, of which, $3N/7$ operations are *push(x)* and $2N/5$ operations are *pop()*. Which of the following statements is true? D
(A) The maximum stack size is $N/7$
(B) The minimum stack size is $N/5$
(C) The final stack size is $N/35$
(D) *pop()* can fail to return a valid element
- 36 Solution of the following set of equations D
 $x + y + z = 1$
 $x - y + z = 3$
 $x + y - z = -1$
(A) $x = -1, y = 1, z = 1$
(B) $x = 1, y = 1, z = -1$
(C) $x = 1, y = 1, z = 1$
(D) $x = 1, y = -1, z = 1$
- 37 In object oriented programming, what is the use of class constructor? D
(A) To instantiate a class
(B) To instantiate an object
(C) To make class initially has some value when it is instantiated
(D) To make object initially has some value when it is instantiated

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- 38 Usage of Preemption and Transaction Rollback prevents _____. B
(A) Unauthorised usage of data file
(B) Deadlock situation
(C) Data manipulation
(D) File preemption
- 39 In RGB colour model, which of the following is NOT correct? D
(A) Red + Green = Yellow
(B) Red + Blue = Magenta
(C) Green + Blue = Cyan
(D) Red + Green = Magenta
- 40 In C, a signed `char` variable is assigned a value of 123. What shall be its value after adding 40? D
(A) 163
(B) -36
(C) -37
(D) -93
- 41 Which of the following statements about a binary search tree having n nodes is NOT correct? D
(A) Value at a node is less than its right child but greater than its left child.
(B) Height of tree can be atmost $(n-1)$.
(C) While deleting, a node can be replaced by rightmost descendant of left child.
(D) Insertion is possible only in rightmost descendant of left child or leftmost descendant of right child.
- 42 Assuming that N is a power of 2, the solution for the recurrence relation $T(N)=2T(N/2)+1$, with initial condition $T(1) = 1$, is: C
(A) $T(N) = 2\log N + 1$
(B) $T(N) = N^2 - N + 1$
(C) $T(N) = N\log N + 1$
(D) $T(N) = 2\log(N/2) + 1$
- 43 Relaxation condition of Dijkstra's shortest path problem is as follows B
(A) $d[v] = \text{maximum}(d[v], d[u] + w(u, v))$
(B) $d[v] = \text{minimum}(d[v], d[u] + w(u, v))$
(C) $d[v] = \text{minimum}(d[u], d[v] + w(u, v))$
(D) $d[v] = \text{maximum}(d[v], d[u], w(u, v))$
- 44 Consider the following sequence D
MRM, LTP, KVS, JXV
next three elements of these sequence are
(A) IZY, HBB, DEG
(B) IYZ, HBB, GDE
(C) IZY, HBB, EGD
(D) IZY, HBB, GDE

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- 45 Minterm and maxterm corresponding to 1001 is given by C
(A) $\overline{A} \overline{B} \overline{C} D$, $A + \overline{B} + \overline{C} + D$
(B) $\overline{A} + B + C + \overline{D}$, $A \overline{B} \overline{C} D$
(C) $A \overline{B} \overline{C} D$, $\overline{A} + B + C + \overline{D}$
(D) $\overline{A} B C \overline{D}$, $A + \overline{B} + \overline{C} + D$
- 46 In XML, the attribute value C
(A) May or may not be quoted
(B) Should be double quoted only
(C) May be single or double quoted
(D) Should be single quoted only
- 47 Assuming that a process spawns multiple threads, which of the following resources is unique to a given thread? C
(A) Code
(B) File Handles
(C) Stack
(D) Data
- 48 Consider a swapping system in which memory consists of the following hole sizes A
 $H_0 = 32K$, $H_1 = 24K$, $H_2 = 10K$, $H_3 = 28K$, $H_4 = 17K$, $H_5 = 19K$, $H_6 = 20K$, $H_7 = 15K$.
For successive requests of (i) 22 K, (ii) 6KB and (iii) 9KB, worst fit shall allocate
(A) H_0, H_3, H_1
(B) H_1, H_2, H_7
(C) H_3, H_1, H_0
(D) H_7, H_2, H_1
- 49 Consider a sequence 1, 5, 11, 19, 29,; next three elements of these sequence are B
(A) 39, 53, 75
(B) 41, 55, 71
(C) 46, 65, 83
(D) 43, 57, 79
- 50 Owing to a faulty implementation of a calculator, precedence of operators from highest to lowest is assigned as follows: C
Addition, Multiplication, Subtraction and Division
Expression $20 - 12 + 18 * 2 / 4$ shall result in an output value of
(A) 17
(B) 13
(C) -10
(D) 8

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51 For the following grammar

B

$$S \rightarrow AB$$

$$A \rightarrow aAa \mid aa$$

$$B \rightarrow Bb \mid b$$

strings produced can be best described by

(A) $(aab)^n \quad n > 0$

(B) $(aa)^n b^m \quad n > 0, m > 0$

(C) $a^n b^n \quad n > 0$

(D) $a^n a^m b^m \quad n > 0, m > 0$

52 #include <stdio.h>

A

```
int unknown( int *a, int b) {
    int t;
    t = *a;  *a = b;
    return t; }
main () {
    int x = 7, y = 3;
    y = unknown(&x, y);
    printf("%d \t %d \n", x, y); }
```

Output of this code shall be

(A) 3 7

(B) 7 3

(C) 3 3

(D) 7 7

53 Binary Number $(100011110010)_2$ can also be expressed as

A

(A) $2^{12} - 2^{11} + 2^8 - 2^4 + 2^2 - 2^1$

(B) $2^{12} - 2^{11} + 2^8 + 2^4 + 2^2 - 2^1$

(C) $2^{12} + 2^{11} - 2^8 - 2^4 + 2^2 - 2^1$

(D) $2^{12} - 2^{11} - 2^8 - 2^4 + 2^2 - 2^1$

54 For following equation, compute the value of Z

B

$$321032_4 + 767_8 = Z_{16}$$

(A) $Z = 1024$

(B) $Z = 1045$

(C) $Z = 1054$

(D) $Z = A024$

55 A memory system consists of RAM (access time 250 microseconds) and a cache (access time 20 microseconds, hit ratio 0.9). Average access time for this system is

B

(A) 270 microseconds

(B) 45 microseconds

(C) 230 microseconds

(D) 12.5 microseconds

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- 56 A sorting machine can sort numbers in ascending order only. This machine can be used for sorting all negative numbers in descending order by C
- (A) Sort numbers, Change sign of all numbers
 - (B) Add 100 to all numbers, sort, subtract 100 again from each number
 - (C) Change sign of all numbers, sort numbers, change sign again
 - (D) Subtract numbers from 100, sort, add 100 again to each number
- 57 Base class is made virtual B
- (A) If it has a virtual function
 - (B) To avoid duplication of base class data when an object inherits the base more than once
 - (C) To hide it from other classes
 - (D) None of the above
- 58 Which of the following algorithms does NOT result in a minimum spanning tree? B
- (A) Boruvka's Algorithm
 - (B) Dijkstra's Algorithm
 - (C) Prim's Algorithm
 - (D) Kruskal's Algorithm
- 59 How many legitimate IP (v4) host addresses can we assign for the following network: 200.23.16.0/23? B
- (A) 508
 - (B) 510
 - (C) 2^{23}
 - (D) $2^{23}-1$
- 60 Consider a stack. In this stack numbers 1, 2, 3, 4 and 5 are pushed. One or more pop operation may follow a push operation. If stack is empty, nothing pops out. Every popped value is displayed on output. After all values have been pushed, contents of stack are popped. Which of the following outputs is NOT possible in this scenario. D
- (A) 3, 4, 2, 1, 5
 - (B) 2, 3, 5, 4, 1
 - (C) 4, 5, 3, 2, 1
 - (D) 4, 5, 2, 1, 3
- 61 Given 5 white, 3 black and 2 red marbles, in how many different ways all these marbles can be arranged in a line such that first and last marble is always red. D
- (A) $10 !$
 - (B) $8 !$
 - (C) $\frac{10 !}{5 ! 3 ! 2 !}$
 - (D) $\frac{8 !}{5 ! 3 !}$

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- 62 A faulty calculator can subtract correctly but yields twice the correct result for addition. For this calculator:
Add $(p, q) = 2(p + q)$,
Subtract $(p, q) = p - q$.
To compute $x + y$, which of the following operations always yields correct result.
(A) Subtract(Subtract(Add (x, y), x), y)
(B) Add(Subtract (x, y), y)
(C) Add(Subtract (y, x), x)
(D) Add(Subtract (y, x), Subtract(x, y)) A
- 63 Consider the statement, "Either $-2 < x \leq 7$ or $x \geq 12$ " The negation of this statement is B
(A) $x < -2$ or $7 \leq x \leq 12$
(B) $x \leq -2$ or $7 < x < 12$
(C) $x \leq -2$ or $7 \leq x < 12$
(D) $x < -2$ or $7 < x \leq 12$
- 64 If PINK is coded as OQHJMOJL, how would ORANGE be coded? B
(A) MPQSZBNOFHDF
(B) NPQSZBMOFHDF
(C) MPQSZBNOFHDF
(D) NPQSZBNOFHDF
- 65 Suppose that a certain software product has a mean time between failures of 10,000 hours and has a mean time to repair of 20 hours. If the product is used by 100 customers, what is its availability? C
(A) 98%
(B) 98.8%
(C) 99.8%
(D) 100%
- 66 Two dice are thrown and outcomes of both dice are noted and added. Probability that sum is divisible by 4 is given by C
(A) $\frac{1}{2}$
(B) $\frac{1}{3}$
(C) $\frac{1}{4}$
(D) $\frac{1}{6}$

67 What is the value of following determinant? A

$$\begin{vmatrix} \alpha & \beta & \gamma \\ \alpha & \beta & \delta \\ \alpha & \theta & \gamma \end{vmatrix}$$

(A) $\alpha(\gamma - \delta)(\theta - \beta)$

(B) $\alpha(\gamma + \delta)(\theta - \beta)$

(C) $\alpha(\gamma - \delta)(\theta + \beta)$

(D) $\alpha(\gamma + \delta)(\theta + \beta)$

68 If $A = \{ a, b \}$, then the number of possible strings of length n is C

(A) n

(B) n^2

(C) 2^n

(D) n^n

69 Which of the following is a storage location that holds inputs and outputs for the ALU? D

(A) Control unit

(B) Memory

(C) I/O device

(D) Registers

70 $(r - 1)$ complement for a number 23102_5 is A

(A) 21342_5

(B) 32453_5

(C) 23102_5

(D) 20132_5

71 An examination paper has 6 multiple-choice questions, each question having 5 possible answer choices. In how many different ways, answer choices can be filled? A

(A) 5^6

(B) 6^5

(C) $6 !$

(D) $5 !$

72 Which of the following relations is FALSE, given that, L, M, N are regular expressions? C

(A) $(L^*)^* = L^*$

(B) $(L^* + M^*)T = L^*T + M^*T$

(C) $L^*M = ML^*$

(D) $(R^*S^*)^* = (R+S)^*$

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- 73 Which of the following statements is FALSE? B
- (A) $\{1, 3, 5\} \subseteq A$ implies that $3 \in A$ and $\{1, 5\} \subseteq A$.
 - (B) $\{1, 3, 5\} \in A$ and $\{3, 5\} \in B$ implies that $\{1\} \subseteq A - B$.
 - (C) $A \cap B \supseteq \{1, 3, 5\}$ implies that $\{1, 3, 5\} \subseteq A$ and $\{1, 3, 5\} \subseteq B$.
 - (D) $A - B \supseteq \{1, 4\}$ and $\{3, 5\} \subseteq B$ implies that $\{1, 3, 4, 5\} \subseteq A \cup B$.
- 74 Addresses that can be accessed by an 8-bit address in which MSB (most significant bit is set to 0) and LSB (least significant bit is set to 1) A
- (A) 1, 3, 5, ..., 125, 127
 - (B) 2, 4, 6, ..., 126, 128
 - (C) 129, 131, ..., 253, 255
 - (D) 130, 132, ..., 254, 256
- 75 A file is downloaded in a home computer using a 56 kbps MODEM connected to an Internet Service Provider. If the download time of the file is 2 minutes, what is the size of the file? B
- (A) 112 Mbits
 - (B) 6.72 Mbits
 - (C) 67.20 Mbits
 - (D) 672 Mbits
- 76 Which of the following is a connection-less protocol? B
- (A) SMTP
 - (B) DNS
 - (C) HTTP
 - (D) FTP
- 77 Consider the following two definitions : C
- `int a[10]; int *p;`
- Which of the following statements is incorrect?
- (A) `p = a+2;`
 - (B) `p=a+2; *p=a[5]`
 - (C) `a=p;`
 - (D) `p = &a[3];`
- 78 Consider a hashing function defined on a decimal number $X = x_k x_{k-1} \dots x_2 x_1 x_0$ (x_0 is least significant digit and x_k is most significant digit) as follows B
- $$h_n(x) = (h_{n-1}(x) + 1) \bmod 10$$
- $$h_1(x) = (x_k + x_0) \bmod 10$$
- $h_4(23567)$ is given by
- (A) 7
 - (B) 2
 - (C) 5
 - (D) 3

Set B**Examination for the post of Assistant Manager**

- 79 Which of the following is NOT a functionality of the TCP (Transmission Control Protocol) layer? B
- (A) Error Detection
 - (B) Error Correction
 - (C) Flow Control
 - (D) Pipelining
- 80 Using digits 1, 2, 3, 4, 5, 6 and 7; how many odd 4-digit numbers can be generated such that all digits are different C
- (A) $7 \times 6 \times 5 \times 4$
 - (B) $7 \times 6 \times 5 \times 3$
 - (C) $6 \times 5 \times 4 \times 4$
 - (D) $3 \times 2 \times 1 \times 4$
- 81 Which of the following is not a type of inheritance? B
- (A) Hierarchical
 - (B) Derived
 - (C) Multi-level
 - (D) Multi-path
- 82 Suppose a new process in a system arrives at an average of six processes per minute and each such process requires an average of 8 seconds of service time. Estimate the fraction of time the CPU is busy in a system with a single processor. D
- (A) 0.2
 - (B) 0.4
 - (C) 0.6
 - (D) 0.8
- 83 Which of the following is a random access protocol? C
- (A) Token Ring
 - (B) FDDI
 - (C) Ethernet
 - (D) OFDMA
- 84 Term "Cache coherence" means D
- (A) cache data is comprehensible
 - (B) cache data can be discarded as it is no longer needed
 - (C) cache data is most recent
 - (D) cache data is in agreement with data in RAM
- 85 Classes may themselves be defined within classes and these are called D
- (A) inherited classes
 - (B) base classes
 - (C) derived classes
 - (D) nested classes

86 Consider a C source file containing following code.

B

```
void main(int argc, char **argv) {  
    int k;  
    for(k=1; k < argc; k++)  
        printf("%c", argv[k][k+1]);  
}
```

The file is compiled into an executable test.exe. What shall be output of the program if following command is run

```
test.exe banana apple orange
```

- (A) bao
- (B) nlq
- (C) apn
- (D) bpa

87 What SQL command will allow you to change the table STUDENT to add the constraint named GradeCheck that states that the values of the Grade column must be greater than 0?

C

- (A) alter table STUDENT alter Constraint GradeCheck (Grade > 0)
- (B) alter table STUDENT add constraint GradeCheck (Grade > 0)
- (C) alter table STUDENT add constraint GradeCheck CHECK (Grade > 0)
- (D) None of the above

88 struct brick {
 char name[8];
 char ext[8];
 int priority;
 union u {
 int x;
 int y;
 float h;
 } com;
};

B

If char requires 1 byte, int requires 4 bytes and float requires 6 bytes of storage, size of struct brick shall be

- (A) 32
- (B) 26
- (C) 12
- (D) 20

89 Minimum and maximum height of a binary heap tree of n nodes is respectively

D

- (A) $\log_2 n$, n
- (B) $\log_2 n$, n^2
- (C) n , n^2
- (D) $\log_2 n$, $\log_2 n$

- 90 Consider following pseudocode D
- ```
while (not end of input)
 c = read next input
 if (c = "a" or c = "b")
 push c on stack
 elseif (c = "x" or c = "y")
 pop from stack and print
 else
 skip
 endif
endwhile
```
- If count(z) indicates number of occurrences of character z in the input expression, this pseudocode shall have empty stack at the end for an input expression satisfying
- (A) count(x) = count(a) and count(y) = count(b)
  - (B) count(x) + count(y) = count(a) + count(b)
  - (C) count(x) = count(b) and count(y) = count(a)
  - (D) all of the above
- 91 The number of states in a minimal deterministic finite automaton corresponding to the language C
- $L = \{ 1^n \mid n \geq 4 \}$  is
- (A) 3
  - (B) 4
  - (C) 5
  - (D) 6
- 92 A Compiler for a high-level language that runs on one machine and produce code for another machine is called C
- (A) Self Compiler
  - (B) Optimizing Compiler
  - (C) Cross Compiler
  - (D) Multi-pass Compiler
- 93 The \_\_\_\_\_ of a program or computing system is the structure or structures of the system, which comprise software components, the externally visible properties of these components, and the relationship among them. C
- (A) E-R diagram
  - (B) Data flow diagram
  - (C) Software architecture
  - (D) Software design
- 94 The most important feature of Spiral model is B
- (A) requirement analysis
  - (B) risk management
  - (C) quality management
  - (D) configuration management

## Set B

## Examination for the post of Assistant Manager

95 Match the terms in Column I to those in Column II

C

| Column I              | Column II                 |
|-----------------------|---------------------------|
| (A) Constant Folding  | (I) Platform Independence |
| (B) Unreachable Code  | (II) 2-address            |
| (C) Intermediate Code | (III) Optimization        |
| (D) Front End         | (IV) Control Flow Graph   |

- (A) A – IV, B – II, C – I, D - III  
 (B) A – II, B – IV, C – I, D - III  
 (C) A – III, B – IV, C – II, D – I  
 (D) A – IV, B – III, C – I, D – II

96 Consider a relation  $R$  (first row indicates attributes).

A

| A  | B  | C  | D  | E  |
|----|----|----|----|----|
| f1 | q1 | r3 | m1 | e2 |
| f1 | q2 | r3 | n4 | e2 |
| g2 | q2 | r4 | n4 | p1 |
| g2 | q3 | r4 | s2 | p1 |
| h3 | q3 | r5 | s2 | z1 |

Functional dependencies for this relation are

- (A)  $A \rightarrow CE, B \rightarrow D$   
 (B)  $A \rightarrow C, B \rightarrow E$   
 (C)  $A \rightarrow BCE$   
 (D)  $D \rightarrow B, C \rightarrow B, E \rightarrow A$

97 For a biased coin, probability of head is  $\frac{1}{4}$ . In three successive tosses of the coin, probability of atleast two heads is

B

- (A)  $(\frac{1}{4})^2 \frac{3}{4} + (\frac{1}{4})^3$   
 (B)  ${}^3C_2 (\frac{1}{4})^2 \frac{3}{4} + (\frac{1}{4})^3$   
 (C)  $(\frac{1}{4})^2 \frac{3}{4} + {}^3C_2 (\frac{1}{4})^3$   
 (D)  ${}^3C_2 (\frac{3}{4})^2 \frac{1}{4} + (\frac{1}{4})^3$

98 Which of the following protocols are NOT used by HTTP?

C

- (A) TCP  
 (B) DNS  
 (C) RTP  
 (D) ICMP

**Set B****Examination for the post of Assistant Manager**

- 99 An IP datagram is 1024 bytes in size. What is the size of the application level payload assuming that the transport protocol is TCP (with no options used) and network layer is IPv4 (with no options used)? C
- (A) 944 bytes
  - (B) 964 bytes
  - (C) 984 bytes
  - (D) 1004 bytes
- 100 Probability that A speaks truth on a fact is  $\frac{2}{3}$  and probability B speaks truth on a fact is  $\frac{4}{5}$ . Probability that A and B contradict each other on a fact is B
- (A)  $\frac{2}{3} \times \frac{4}{5}$
  - (B)  $\frac{2}{3} \times \frac{1}{5} + \frac{1}{3} \times \frac{4}{5}$
  - (C)  $\frac{1}{3} \times \frac{1}{5} + \frac{2}{3} \times \frac{4}{5}$
  - (D)  $\frac{1}{3} \times \frac{1}{5}$