Instructions for the Candidates	परीक्षार्थियों के लिए निर्देश
1. Write your roll number in the space provided on the top of this page.	1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. This paper consists of seventy five multiple-choice type of questions.	2. इस प्रश्न-पत्र में पिच्हेत्तर बहुविकल्पीय प्रश्न हैं।
3. At the commencement of examination, the question bookelt will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :	3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी। पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
(i) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Fault booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.	(i) कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं। दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें। इसके लिए आपको पाँच मिनट दिये जायेंगे। उसके बाद न तो आपको प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा।
(ii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.	(ii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें।
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item. Example : Ⓐ Ⓑ ● Ⓓ where (C) is the correct response.	4. प्रत्येक प्रश्न के लिए चार उत्तर पत्रक विकल्प (A), (B), (C) तथा (D) दिये गये हैं। आपको सही उत्तर के दीर्घवृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है। उदाहरण : Ⓐ Ⓑ ● Ⓓ जबकि (C) सही उत्तर है।
5. Your responses to the items are to be indicated in the Answer Sheet given inside the Paper I Booklet only. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.	5. प्रश्नों के उत्तर केवल प्रश्न पत्र I के अन्दर दिये गये उत्तर-पत्रक पर ही अंकित करने हैं। यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिन्हांकित करते हैं, तो उसका मूल्यांकन नहीं होगा।
6. Read instructions given inside carefully.	6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
7. Rough Work is to be done in the end of this booklet.	7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें।
8. If you write your name or put any mark on any part of the test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.	8. यदि आप उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
9. You have to return the test question booklet and OMR Answer sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.	9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं OMR उत्तर-पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
10. Students can take home carbon copy of this OMR answer sheet.	10. परीक्षा समाप्ति पर परीक्षार्थी OMR उत्तर-पत्रक की कार्बन कापी अपने साथ ले जा सकते हैं।
11. Use only Blue/Black Ball point pen.	11. केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें।
12. Use of any calculator or log table etc., is prohibited.	12. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।
13. There is no negative marks for incorrect answers.	13. गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे।

Paper Code : [22]
Paper-III [COMPUTER SCIENCE & APPLICATION]

Note : • This paper contains Seventy Five (75) multiple choice questions, each question carrying two (2) marks.

नोट : • इस प्रश्नपत्र में पिच्हेत्तर (75) बहुविकल्पीय प्रश्न हैं। प्रत्येक प्रश्न के दो (2) अंक हैं।

1. A micro-instruction is to be designed to specify :

    (i) none or one of the three micro-operations of one kind, and

    (ii) none or upto six micro-operations of another kind

    The maximum number of bits in the micro-instruction is :

    (A) 9   (B) 5

    (C) 8   (D) None of these

2. In 8085 microprocessor system, the direct addressing instruction is :

    (A) MoV A, B   (B) MOV B, OAH

    (C) MOV C, M   (D) STA adder

3. In 8085 microprocessor, the value of the most significant bit of the result following the execution of any arithmetic or boolean instruction is stored in the :

    (A) Carry status flag   (B) Auxilary carry status flag

    (C) Sign status flag   (D) Zero status flag

4. Number of machine cycles required for RET instruction in 8085 is :

    (A) 1   (B) 2

    (C) 3   (D) 5

5. Which of the following devices should get higher priority in assigning interrupts ?

    (A) Hard Disk   (B) Printer

    (C) Keyboard   (D) Floppy disk

6. Relations produced from on E-R model will always be in :

    (A) 1NF   (B) 2NF

    (C) 3NF   (D) 4NF

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 relationship between the tables that connect them

    (C) Network model between the tables connect them

    (D) None of the above

8. Given the following relation instance :

X	Y	Z
1	4	2
1	5	3
1	6	3
3	2	2

Which of the following functional dependencies are satisfied by the instance ?

(A) $XY \to Z$ and $Z \to Y$

(B) $YZ \to X$ and $Y \to Z$

(C) $YZ \to X$ and $X \to Z$

(D) $XZ \to Y$ and $Y \to X$

9. Functional dependencies are a generalization of :

(A) Key dependencies

(B) Relation dependencies

(C) Database dependencies

(D) None of these

10. A relational database management package manages data in more than one file at once. How does it organize these files ? As :

(A) Tables

(B) Relations

(C) Tuple

(D) Both (A) and (B) above

11. In computer graphic transformation process we use homogeneous coordinate system, because of any one or more of the following reasons :

(i) It is simpler to use

(ii) Matrix operation can be uniformly applied to all the modes of transformation

(iii) Scaling cannot be done in cartesian coordinate system

(iv) Linear movement can be done with Matrix operation in homogeneous coordinate system

(A) (i) only

(B) (ii) only

(C) (i) & (iii)

(D) (ii) & (iv)

12. We can atmost have three vanishing points during perspective projection, because :

(i) There are only 3-coordinates

(ii) Since we are considering a solid body

(iii) Projection has this feature

(iv) You can have as many vanishing points as defined by the solid

(A) (i) only

(B) (ii) only

(C) (i) & (iii)

(D) (iv)

13. Cyrus-Back algorithm can be applied to any shape of window, whereas other clipping algorithm have limitations :

(i) C-B can be applied in 2D & 3-D both

(ii) C-B can be applied to convex, as well as concave with certain innovation

(iii) Extension of other algorithms from 2-D to 3-D is very difficult

(iv) C-B cannot be applied to concave surfaces

(A) (i) only   (B) (i) & (ii)

(C) (iv)   (D) (i), (ii) & (iii)

14. A few decades earlier interactive graphic was not possible, because of :

(i) non availability of interactive hardware

(ii) non availability of interactive software

(iii) low speed of processing

(iv) none of these

(A) (i) only   (B) (ii) only

(C) (iii) only   (D) (iv) only

15. Today it is not possible to represent million of colours because of only three main colours RGB, whereas the nature has seven colour of rainbow :

(i)   Not true, with RGB, theoretically with proper combination we can represent almost all the colours available in the nature

(ii)   With RGB, you can have only 256 different types of colours

(iii)   Three main colours cannot replace seven colours of the nature

(iv)   None of these

(A) (i) only   (B) (ii) only

(C) (iii) only   (D) (iv) only

16. Which one of the following grammer is ambiguous ?

(A) S → OS 1/01   (B) S → S(S) S|∈

(C) S → aSb S|bSaS|∈   (D) Both (b) and (c)

17. Consider the following grammer :

    S → aSbS|bSaS|∈

    How many different parse trees are possible for string ababab ?

    (A) 2   (B) 3

    (C) 4   (D) 5

18. Consider the following grammer :

    S' → S#

    S → AB

    A → a|∈

    B → b|∈

    What can you conclude about the statement, "The given grammer is in LL(1)" ?

    (A) The statement is true.

    (B) The statement is false because the grammer contains ∈.

    (C) The statements is false because grammer is ambiguous.

    (D) Data is insufficient for concluding anything.

19. Consider the following grammer :

    S → AA

    A → aA|b

    Statement : in the parsing table constructed from the given grammer no shift-reduce conflict will be there.

    Which of the following is true regarding the given statement ?

    (A) The above statement is correct.

    (B) The above statement is incorrect because of the production S → AA.

    (C) The above statement is incorrect because of the product A → aA/b.

    (D) Data is insufficient.

20. Consider the following languages :

L1 : $A^n A^{2n}$ $n > 0$

L2 : $A^n B^{2n} C^n$, $n > 0$

Then which of the following is true ?

(A) L1 but not L2 is LR (k)

(B) L2 but not L1 is LR (k)

(C) Both L1 and L2 are LR(k)

(D) None of L1 and L2 are LR(k)

21. Slotted ALOHA :

(A) Required global time synchronization

(B) Divide time into discrete intervals

(C) Both (a) and (b)

(D) None of these

22. For shop-and-wat flow control, for n data packets sent, how many acknowledgments are needed ?

(A) n

(B) n + 1

(C) 2n

(D) n − 1

23. A device that links two homogenous packets broadcast local networks, is :

(A) gateway

(B) bridge

(C) hub

(D) None of these

24. When data is transmitted from device A to B, the header from A's layer 5 is read by B's :

(A) Physical layer

(B) Transport layer

(C) Session layer

(D) Presentation layer

25. Consider the following possible data structures for a set of n distinct integers.

I. A min-heap

II. An array of length n sorted in increasing order

III. A balanced binary search tree

For which of these data structures is the number of steps needed to find and remove the 7th largest element $O(\log n)$ in the worst case ?

(A) I only

(B) II only

(C) I and II

(D) II and III

26. Let k be an integer greater than 1. Which of the following represents the order of growth of the expression $\sum\limits_{i=1}^{n} k^i$ as a function on n ?

(A) $O(k^n)$

(B) $O(k^n \log n)$

(C) $O(k^n \log n)$

(D) $O(k^{2kn})$

27. Of the following problems concerning a given undirected graph G, which is currently known to be solvable in polynomial time ?

(A) Finding a longest simple cycle in G

(B) Finding a shortest cycle in G

(C) Finding ALL spanning trees of G

(D) Finding a largest clique in G

28. For a connected, undirected graph $G = (V, E)$, which of the following must be true ?

I. $\sum_{v \in V}$ degree (v) is even.

II. $|E| \geq |V| - 1$

III. G has at least one vertex with degree 1.

(A) I only

(B) II only

(C) III only

(D) I and II

29. The time complexity of computing the transitive closure of a binary relation on a set of n elements is known to be :

(A) $0(n^3)$

(B) $0\left(n^{\frac{3}{2}}\right)$

(C) $0(n)$

(D) None of these

30. The highest lower bound on the number of comparisons in the worst case, for comparision based sorting is of the order of :

(A) n log n

(B) n^2

(C) n

(D) None of these

31. A subsystem of a complex system :

(i) should be reusable in other complex system

(ii) must not be able to inherit the properties of other subsystems

(iii) must have clearly specified responsibilities

(iv) must know the stimuli to which it should respond

(A) i, ii, iii

(B) ii, iii, iv

(C) i, iii, iv

(D) i, ii, iv

32. How many copies of a class static member are shared between objects of the class ?

(A) A copy of the static member is shared by all objects of a class

(B) A copy is created only when at least one object is created from that class

(C) A copy of the static member is created for each instantiation of the class

(D) No memory is allocated for static members of a class

33. Which statement is *not* true ?

(A) An HTML document can be displayed in any internet browser

(B) HTML is used to change the formatting of the displayed text

(C) An HTML document is created with an HTML development editor

(D) All of the above

34. The tag used in HTML to link it with other URL's is :

(A) <A>   (B) <H>

(C) <U>   (D) <L>

35. HTML uses :

(A) pre-specified tags   (B) user defined tags

(C) tags only for linking   (D) fixed tags defined by the language

36. During the data gathering phase of system analysis :

(A) problem flowcharts are often prepared

(B) system design specification are outlined

(C) a no. of specilized forms may be prepared

(D) none of these

37. First step of implementation phase is :

(A) Select computer   (B) Implementation planning

(C) Prepare physical facilites   (D) None of these

38. Iterative enhancement model is a :

(A) 3 stages   (B) 6 stages

(C) 4 stages   (D) None of these

39. Risk management refers :

(A) List of potential risk

(B) Prioritized list of risk

(C) Risk avoidance

(D) Risk assessment

40. Regression testing is known as :

(A) The process of retesting the modified parts of software

(B) Process of testing the design document

(C) Review the SRS

(D) None of these

41. The following program consists of 3 concurrent processes and 3 binary semaphores. The semaphores are initialized as S0 = 1, S1 = 0, S2 = 0.

Process P0	Process P1	Process P2

while (true) {
wait (S0);
print '0'
release (S1);
release (S2);
}
	wait (S1);
	Release (S0);
		wait (S2);
		release (S0);

How many times will process P0 print '0' ? .

(A) At least twice

(B) Exactly twice

(C) Exactly thrice

(D) Exactly once

42. A CPU generally handles an interrupt by executing an interrupt service routine :

(A) As soon as an interrupt is raised

(B) By checking the interrupt register at the end of fetch cycle

(C) By checking the interrupt register after finishing the execution of the current instruction

(D) By checking the interrupt register at fixed time intervals

43. Which of the following is NOT a reasonable justification for choosing to busy-wait on an asynchronous event ?

(A) The wait is expected to be short

(B) A busy-wait loop is easier to code than an interrupt handler

(C) There is no other work for the processor to do

(D) The program executes on a time-sharing system

44. How many address lines are required to access 30K memory system :

(A) 30

(B) 14

(C) 10

(D) None of these

45. RIM stands for :

(A) Reset interface mask

(B) Reset interrupt mask

(C) Read interrupt mask

(D) Read interface mask

46. Can computer think ? Normally computers were used for solving structured problems, but with advancement scientists are putting computers to solve unstructured problems and decision making. In near future the computers may start thinking like human beings because :

(i) Expert systems are just thinking & reasoning system.

(ii) Computers can be trained to solve unstructured probelms.

(iii) Computers cannot think, because these are machines and would perform only what is programmed to do.

(iv) Advancing trend shows computers will become Smarter day by day.

(A) (i) only

(B) (ii) only

(C) (iii) only

(D) (i), (ii) & (iii)

47. Term AI is misnomer, because AI is nothing what smart programming. It is scientist who program to say play chess, on computer is one of the important examples of AI. Identify correct statements :

(i) It is true, intellgence in computer is the result of programmes effect.

(ii) It is not true, as computer once trained can learn to solve other problems.

(iii) Some of the problems which are trivid for human like reading, speaking & listening is difficult for computer. So computer is not intelligent.

(iv) all of these

(A) (i) only

(B) (ii) only

(C) (iii) only

(D) (iv) only

48. Under estimation of heuristic function in best-first search procedure may lead to unending or long search because :

(i) This may lead to search of wrong leaf.

(ii) It doesnot matter, ultimately we will get the result.

(iii) System can correct.

(iv) None of these

(A) (i) only   (B) (ii) only

(C) (iii) only   (D) (iv) only

49. Expert system is also Decision Support System, because :

(i) It provides if and then consequence.

(ii) It can be used in association with other DSS.

(iii) (i) & (ii) above

(iv) None of these

(A) (i) only   (B) (ii) only

(C) (iii)   (D) (iv)

50. Which computer language was used for development of expert system MYCIN ?

(i) LISP   (ii) PROLOG

(iii) FORTRAN   (iv) None of these

(A) (i) only   (B) (ii) only

(C) (iii) only   (D) (iv)

51. Let $L \subseteq \Sigma^*$ where $\Sigma = \{m, n\}$, then which of the following is false ?

(A) $L = \{m^c n^d \mid c \geq 1, d \geq 1\}$ is regular

(B) $L = \{x \mid$ There are more m then n$\}$ is not regular

(C) $L = \{m^a n^a \mid a \geq 1\}$ is regular

(D) $L = \{x \mid x$ has an equal number of m's and n's$\}$ is not regular

52. Let $\Sigma = \{a, b\}$, $L = \Sigma^*$ and $R \{a^n b^n$ such that $n > 0\}$. Then the languages LLR and R are respectively :

(A) Regular, Regular   (B) Not Regular, Regular

(C) Regular, Not Regular   (D) Not Regular, Not Regular

53. Consider the following statements :

(i) r + (s + t) = (r + s) + t

(ii) r(s + t) = rs + rt

(iii) (rs) * t = r(st) *

Which of the above are true about regular expression r, s and t ?

(A) (i) only

(B) (i) and (ii)

(C) (i), (ii) and (iii)

(D) None of these

54. Let R_1 and R_2 regular sets defined over the alphabet Z then which of the following is true ?

(A) $R_1 \cup R_2$ is regular

(B) $Z-R_1$ is regular

(C) $R_1 *$ is not regular

(D) Both (a) and (b)

55. The class of context-free language is not closed under :

(A) Concatenation

(B) Intersection

(C) Union

(D) None of these

56. To gurantee the *detection* of upto 5 errors in all cases, the minimum Hamming distance in a block code must be :

(A) 5

(B) 6

(C) 11

(D) 7

57. To gurantee *correction* of upto 5 errors in all cases, the minimum Hamming distance in a block code must be ....

(A) 5

(B) 6

(C) 11

(D) 7

58. Hamming distance between equal codewords is ....

(A) 1

(B) n

(C) 0

(D) n^2

59. Hamming distance between 100 and 001 is :

(A) 2

(B) 0

(C) 1

(D) None of the above

60. High data compression in audio/video is associated with :

(A) Increased processing time

(B) Increased transmission time

(C) Increased channel error rate

(D) Poor reconstruction quality

61. An organization has four programs who have to be assigned programmer to be developed. Estimated time by each expert is given below :

Programs

Programmers		A	B	C	D
	1	120	100	80	90
	2	80	90	110	70
	3	110	140	120	100
	4	90	90	80	90

State which option leads to minimum time :

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

62. Identify the following statements are eithest True (T)/False (F) :

(i) The earliest finish time for an activity depends on the earlier finish time for the project.

(ii) All activites on the critical path have their latest time equal to their start time.

	(i)	(ii)
(A)	T	T
(B)	T	F
(C)	F	T
(D)	F	F

63. The marginal cost of crashing a network could change when :

(A) The activity being crashed reaches its crash time.

(B) The activity being crashed reaches a point where another path is also critical.

(C) Both (A) & (B)

(D) None of these

64. Consider the following LPP :

max : $Z = 80x_1 + 120x_2$

subject to $x_1 + x_2 \leq 9$

$20x_1 + 50x_2 \leq 360$

$x_1 \geq 2$

$x_2 \geq 3$

$x_1 \geq 0, x_2 \geq 0$

whichof the following (x_1, x_2) is optimal solution of the problem ?

(A) (3, 5)   (B) (3, 4)

(C) (6, 0)   (D) (3, 6)

65. The drawback to using transportation problem method is solving an assignment problem is that :

(A) A degeneracy results from every improvement in the total cost.

(B) The assignment problem can't be formulated as a Transportation problem.

(C) The assignment problem is an unbalanced transportation problem.

(D) Too many alternative optimal result.

66. What is the main difference between probability and fuzzy logic ?

(A) Fuzzy logic is probability in disguise.

(B) Fuzzy logic is the likelihood of an event occuring and probability is the extent of that event.

(C) Probability is ADDITIVE, meaning all its values must add up to one.

(D) Probability dissipates with decreasing information.

67. Where is the minimum criterion used ?

(A) When there is an AND operation   (B) When there is an OR operation

(C) In De Morgan's theorem   (D) None of the above

68. Neural network is based on the principle of working of human neurons.Why NN was not successful till feedback was addea ?

(A) Because human also learns by feedback

(B) During learning process of NN through feed back we force output from input

(C) Feed back helps to correct the errors and improve input-output relation

(D) All the above

69. We hear fuzzy blades, fuzzy washing machines. Are these based on some logic or just markely practice :

(A) Just a marketing approach

(B) Based on scientific reasoning

(C) Based on Fuzzy logic, the machines/blades are provided special features

(D) Both (B) & (C)

70. Fuzzy set is like normal set, but is not having discrete cut off. This helps in better defining some natural features because :

(A) It is difficult to define absolute beauty.

(B) Long or tall has no meaning until or unless compared.

(C) Fuzzy set is another confusing approach.

(D) Both (A & B)

71. When a user delete a file, empties the recycle bin, what happens to the file ?

(A) Sector hard drive and blanked/erased   (B) Clusters are flushed

(C) The file is moved to c:/windows/temp   (D) Associated entries in the FAT are removed

72. Multithreading performance depends on ....

(A) Calculation and Size of input data   (B) Hardware

(C) Operating system   (D) All of the above

73. On what platform is multithreading supported ?

(A) IDL 5.5   (B) IDL 5.6

(C) Support on all platform   (D) None of these

74. Which of the following is *not* a communication command ?

(A) Write   (B) Mesg

(C) mail   (D) grep

75. Which command is used to change the protection mode of files with the string emp and ending with 1, 2, or 3 ?

(A) Chmod u + x emp [1 – 3]   (B) Chmod 777 emp*

(C) Chmod u + r ??? emp   (D) Chmod 777 emp ?