TEST SERIES UGC-NET/JRF DEC. 2018

BOOKLET SERIES E

Paper Code 87

Test Type: TEST SERIES

COMPUTER SCIENCE & APPLICATIONS

Duration: 03:00 Hours

Date: 07-12-2018

Maximum Marks: 300

Read the following instructions carefully:

1. Single Paper Test is divided into **TWO** Parts.
2. **Paper - I:** This part shall carry **50** questions. Each question shall be of **2 marks.**
3. **Paper - II:** This part shall contain **100** questions. Each question shall be of **2 marks**.
4. There will be no negative marking.
5. Darken the appropriate bubbles with HB pencil/Ball Pen to write your answer.
6. The candidates shall be allowed to carry the Question Paper Booklet after completion of the exam.

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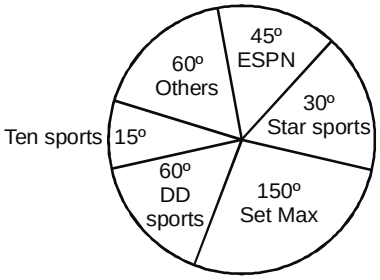
PAPER-I

Direction for Q.1 to Q.3 : These question based on the pie chart. Which show the viewership of different sports channels in the month of February 2003 in India. There are no overlaps in viewership of channels.

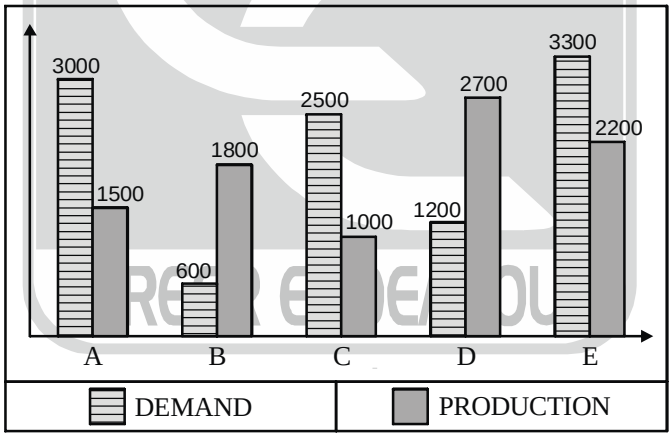


1. During the given period for how many sports channel is the viewership is more than 20% of the total viewership?
(a) 1 (b) 2 (c) 3 (d) cannot be determined

2. If the viewership of DD sports for the first half of February is half that of the second half of February, then what is the ratio of viewership of DD sports for the second half to that of ESPN for the whole month ?
(a) 2 : 3 (b) 5 : 6 (c) 8 : 9 (d) 9 : 10

3. By mistake viewership of DD sports has been under quoted by 20%. If this mistake is correct, then what is correct share of viewership of Set max ?
(a) $41\frac{2}{3}\%$ (b) 35 % (c) 40 % (d) cannot be determined

Direction for Q.4 to Q.5 : Deman and production of colour TV's of five companies for october 1992 :



4. What is the ratio of the number of companies having more demand, then production to those having more production that demand ?
(a) 2 : 3 (b) 4 : 1 (c) 2 : 2 (d) 3 : 2

5. If company 'A' desired to meet the demand by purchasing surplus TV set from a single company. Which companies can meet the need completely ?
(a) B (b) C (c) D (d) E

6. Statement : Should small states be formed out of bigger states in India ?
Arguments : (I) Yes, there will be greater administrative convenience, (II) No, it will be a jeopardize the national integration.
(a) Only (I) argument is strong (b) Only (II) argument is strong
(c) If both (I) and (II) are strong (d) Neither (I) nor (II)

7. Assertion (A) : The steam engine was invented by James watt.
Reason (R) : There was a problem of taking out water from flooded mines.
(a) Both (A) and (R) are true and (R) is the correct explanation of (A).
(b) (A) is false, but (R) is true.
(c) (A) is true, but (R) is false.
(d) Both (A) and (R) are false.

8. Statement :
(i) All girls are cute. (ii) All cute are westernised.
Conclusion :
(1) Some cute are girls. (2) No cute is a girls.
(3) Some westernised are girls. (4) All westernised are girls.
(a) Only (1) and (3) follows (b) Only (1) follows
(c) Either (3) or (4) follows (d) None of these

9. The age of Arvind's father is 4 times of his age. If 5 years ago. Father's age was 7 times of the age of his son. What is the age of Arvind's father at present ?
(a) 35 (b) 40 (c) 70 (d) 84

10. Find out the missing number in the following ?

1	2	3
11	7	5
120	45	?

(a) 15 (b) 16 (c) 17 (d) 18

11. The wheat sold by a grocer contained 10% low quality wheat. What quantity of good quantity wheat should be added to 250 kg of wheat, so that the percentage of low quantity wheat becomes 5% ?
(a) 285 kg (b) 250 kg (c) 135 kg (d) 150 kg

Direction for Q.12 to Q.14 : A cubical toy with six surface has different fruits on each of its six surfaces - orange, watermelon, mango, banana, grapes and apple, but not in the same order. Orange is on the topmost surface. To the adjacent surface of banana lie the watermelon and the orange. The apple is not at the bottom surface of the given cube and watermelon lies on the opposite surface containing picture of grapes.

12. Which of these pictures is not on the adjacent surface of mango. Which is on the 6^{th} surface ?
(a) Apple (b) Orange (c) Grapes (d) Banana

13. What will be the picture exactly opposite to apple ?
(a) Banana (b) Grapes (c) Orange (d) Mango

14. Which of these pairs of fruits are not on the corresponding opposite surfaces of the cube ?
(a) Orange-Mango (b) Apple-Banana (c) Apple-Mango (d) All of these

15. There are some benches in a classroom. If 4 students sit on each bench, then 3 benches are left unoccupied. However if 3 students sit on each bench 3 students are left standing. How, many students are these in the class?
(a) 36 (b) 48 (c) 56 (d) 64

16. In Tagorian Education System the child learns better by
I. Debates and Discussion
II. Reading, Writing and Speaking
III. Dance, Drama and Music
IV. Travelling and interacting with nature.
In the context of the above, which statements are true ?
(a) All I, II, III and IV are true. (b) Statements I, III and IV are true.
(c) Statements I, II and III are true. (d) Statements II, III and IV are true.

17. Re-arrange the following steps of social learning theory as given by Bandura.
(A) Remembering the behaviour.
(B) Converting the memory into action.
(C) Reinforcement of the imitated behaviour.
(D) Attending to and perceiving the behaviour.
(a) A, B, D, C (b) D, A, B, C (c) D, A, C, B (d) A, D, B, C

18. An existentialistic teacher should emphasize on
I. Freedom
II. Responsibility
III. Subjective feelings
IV. Cooperative living
In the above which combination is correct?
Codes:
(a) I & II are correct.
(b) I & III are correct.
(c) I, II & III are correct.
(d) II, III & IV are correct.

19. A serious minded teacher as a rule
(a) allows the mistakes to be committed and explains how to minimise those mistakes
(b) never allows any mistakes on the part of his students.
(c) takes all precaution so that students never commit mistakes
(d) should mildly punish students who commit mistakes

20. If a teacher has to establish his credibility in evaluating answer scripts he must be
(a) strict (b) anient
(c) objective (d) prompt

21. Read the following statements about a laboratory experiment.
I. It has relatively complete control of extraneous variables.
II. Its results are applicable to real life situations.
Which of the following is correct?
Codes:
(A) Both I and II are correct.
(B) I is incorrect, but II is correct.
(C) Neither of I and II is correct.
(D) I is correct, but II is incorrect.

22. Which of the following is not correctly matched?
(a) Achievement Test – Content validity
(b) Aptitude Test – Predictive validity
(c) Reasoning Test – Content validity
(d) Personality test – Concurrent validity

23. Which of the following is a weakness of quantitative research?
(a) Provides precise, numerical data
(b) The researcher's categories that are used might not reflect local constituencies' understandings
(c) Testing hypotheses that are constructed before the data are collected
(d) Can study a large number of people

24. Qualitative research is an important type of which form of research?
(a) Motivation research (b) Quantitative research
(c) Applied research
(d) Fundamental research

25. Suppose, you are doing experiment on a large group of sample which method of controlling will you adopt?
(a) Elimination
(b) Elimination and matching both
(c) Randomization
(d) Matching

READ THE FOLLOWING PASSAGE AND ANSWER THE QUESTIONS. [Q. 26 TO Q. 30]

The computer is a fairly recent invention. It has now become an essential part of modern life. It has greatly benefited us and brought about revolutionary changes in our life.

Any device that helps people perform mathematical calculations may be called a 'computer'. In this sense, the Abacus is also a simple computer. Today, however, the term computer refers to a special kind of electronic machine that can perform mathematical calculation and process large masses of information at a great speed. In a few minutes a computer can perform calculations that trained mathematics would need years to complete. The fastest computers can handle millions of problems in a few seconds.

It cannot only solve complex mathematical problems quickly and accurately, but also perform many operations at one and the same time without any confusion. The computer promises to free men from many monotonous and routine tasks. Nows a days the computer has become very sophisticated and can perform many complicted tasks. It can run business, play chess or even compose music. This is why, people call the computer 'an electronic brain'. Nowadays computers are most widely employed in data processing, handling the fast paper work of industry, commerce and government. Modern banking would be impossible without computers. Computer has brought new speed and accuracy to weather forcasting. Computer is indeed a great wonder of modern age. It is hoped that computers will be able to think and act independently.

26. Computer has become essential part of modern life because:
(a) it does calculation very fast
(b) it is the recent scientific invention
(c) human society prefers technology rather than anything else.
(d) it can do several tedious activities at a greater speed.

27. Computation in modern world involves
(a) fast calculation
(b) development of science and technology
(c) processing of information
(d) an upgradation of human life style

28. Computer is called 'an electronic brain' because:
(a) it is analagous to human brain
(b) it substitutes some of the human activities
(c) it has aesthetic sense
(d) its intelligence is at par with human intelligence.

29. The future of computer is:
(a) black
(b) depends upon economical growth
(c) bright
(d) fearful as it will replace human beings.

30. Modern banking would be impossible without computers:
(a) since it will lapse in pace.
(b) since the huge amounts of calculation can be done only by computers.
(c) since there is no large manpower.
(d) since a huge amount of data has to be processed at a time at the centres spread across the world.

31. Informal communication network within the organization is known as
(a) intrapersonal communication
(b) interpersonal communication
(c) grapevine communication
(d) mass communication

32. The main objective of public broadcasting system i.e., Prasar Bharti is
(a) Entertainment only
(b) Educate, Interact and Entertain
(c) Entertain, Inform and Education
(d) Inform, Entertainment and Education

33. All are the examples of the media of two way communication except
(a) procession and rallies
(b) street plays
(c) rath yatras
(d) public meeting

34. The most powerful barrier of communication in the class room is
(a) lack of teaching acids (b) more outside disturbances in the class room
(c) confusion on the part of the teacher (d) noise in the classroom

35. Schramm (1955) determined that communication consisted of a series of core, essentially sequential activities. These are:
(a) encoding, understanding, and decoding
(b) encoding, decoding, and feedback
(c) sourcing, encoding, and decoding
(d) encoding, signal, and decoding

36. Ecological boomerang is
(a) heat emission due to bomb explosion
(b) production of useful ecological effect by a previously useful chemical
(c) production of adverse ecological effect by a previously useful chemical
(d) none of these

37. The accumulation dangerous radioactive materials into the bodies of larger process of food-chain is called,
(a) Ecological inversion (b) Bioaccumulation
(c) Ecoaccumulation (d) Biodiversity inversion

38. Which of the following is true about NATIONAL DOLPHIN RESEARCH CENTRE?
1. It will be established at Patna University
2. It will be Asia's first Dolphin Research Center.
3. Bihar is the home of about half of total gangetic dolphins of India.
4. Gangetic river dolphin is one of the four freshwater dolphin species in the world
(a) 1, 2, 3 (b) 1, 2, 4 (c) 2, 3, 4 (d) 1, 2, 3, 4

39. Which of the following is true about Land slide?
1. Landslides are a type of "mass wasting,
2 Landslide encompasses five modes of slope movement: falls, topples, slides, spreads, and flows.
3. These are further subdivided by the type of geologic material (bedrock, debris, or earth).
4. Almost every landslide has multiple causes.
5. Slope movement occurs when forces acting down-slope (mainly due to gravity) exceed the strength of the earth materials that compose the slope.
(a) 1, 2, 4 (b) All except 1 (c) 1, 2, 3, 5 (d) All of these

40. A normal component of environment which becomes pollutant when its concentration crosses a thrushold value is called
(a) Physical pollutant (b) Degradable pollutant
(c) Qualitative pollutant (d) Quantitative pollutant

41. Which of the following supports scientific research through a chain of specialized research laboratories?
(a) Council of Scientific and Industrial Research (CSIR)
(b) Indian Council of Philosophical Research (ICPR)
(c) Indian Council of Historical Research (ICSSR)
(d) Indian Council of Social Science Research (ICSSR)

42. Which of the following was/were committees associated with the Constituent Assembly of India?
1. Welfare State Ideals committee
2. A States Committee for Negotiating with the States
3. A provincial Constitution Committee
Select the correct answer using the codes below.
(a) 1 and 2 only (b) 2 only (c) 1, 2, 3 (d) 2 and 3 only

43. The value of secularism can be found in which of the following parts of the constitution?
1. Preamble
2. Directive Principles of State Policy
3. Fundamental Duties
4. Fundamental Rights

Select the correct answer using the codes below.
(a) 1 and 2 only (b) 3 and 4 only (c) 1, 3 and 4 only (d) 1, 2, 3 and 4

44. What is the difference between "vote-on-account" and "interim budget"?
1. The provision of a "vote-on-account" is used by a regular Government, while an "interim budget" is a provision used by a caretaker Government.
2. A "vote-on-account" only deals with the expenditure in Government's budget, while an "interim budget" includes both expenditure and receipts.

Which of the statements; given above is/are correct?
(a) 1 only (b) 2 only (c) Both 1 and 2 (d) Neither 1 nor 2

45. Which of the following is true about National Research Professorship?
1. Government of India had instituted the scheme of National Research Professorship in 1949 to honour distinguished academics and scholars in recognition of their contribution to knowledge.
2. Persons of real eminence, who have attained the age of 65 years and have made outstanding contributions in their respective fields and are still capable of productive research, are considered for appointment as National Research Professors.

(a) Only 1 (b) Only 2 (c) Both 1 and 2 (d) Neither 1 nor 2

46. Assertion (A): Forest fire frequencies are increasing in India.
Reason (R): India's monsoons are largely responsible for seasonal nature of forest fires in the country. Forest fires peak during dry months of March or April before the arrival of monsoon.
Choose the correct code:
(a) Both (A) and (R) are correct and (R) is the correct explanation of (A).
(b) Both (A) and (R) are correct, but (R) is not the correct explanation of (A).
(c) (A) is true and (R) is false.
(d) (A) is false and (R) is true.

47. Article 358 & 359 describe the effect of a National Emergency on the Fundamental right. Which of the following statements are correct with regard to Article 358 & 359.
1. Article 358 operates only in the case of External emergency and not in the case of Internal emergency.
2. Article 359 operates in case of both External & Internal emergency.
3. Article 358 suspends FR under article 19 for the entire duration of emergency.
4. Article 358 extends to the entire country whereas article 359 may extend to entire country or part of it.

(a) 1 & 2 only (b) 1, 2 & 3 only (c) 2, 3 & 4 only (d) 1, 2, 3 & 4

48. Littlejohn (1992) identifies four main contexts within which communication occurs. These are
(a) interpersonal, group, organisational and mass communication.
(b) interpersonal, group, organisational and interactional communication.
(c) interpersonal, group, organisational and linear communication.
(d) interpersonal, group, organisational and relational communication.

49. Which of the following can be used for forecasting?
(a) Regression Analysis (b) Correlation
(c) Cross-Sectional Studies (d) Experiment

50. Match the following:

Educational Research type	Research Sub type/example
A. Descriptive	1. Survey
B. Qualitative	2. Correlational
C. Associational	3. Experimental
D. Intervention	4. Ethnographic

(a) A-1, B-2, C-3, D-4
(b) A-1, B-4, C-2, D-3
(c) A-4, B-1, C-2, D-3
(d) A-3, B-2, C-1, D-4

PAPER-II

1. To find max or min element in an unordered list is O(n). Similarly, to find a element in the same list which is neither max nor min is of [Assume list contains distinct elements]

   (a) $\theta(n)$ (b) $\theta(\log n)$ (c) $\theta(1)$ (d) $\theta(\sqrt{n})$

2. When $n = 3^{3k}$, $k \geq 0$, then $T(n) = \sqrt{3}\,T\left(\frac{n}{3}\right) + \sqrt{n}$, $T(1) = 1$ evaluates to:

   (a) $\sqrt{n}\,(\log n - 1)$ (b) $n \log n$ (c) $\sqrt{n}\,(\log n + 1)$ (d) None of these

3. Evaluates to : $T(n) = T\left(\frac{3n}{16}\right) + T\left(\frac{2n}{16}\right) + T\left(\frac{5n}{16}\right) + T\left(\frac{6n}{16}\right) + n$

   (a) $\theta(n^2)$ (b) $\theta(n^2 \log n)$ (c) $\theta(n\sqrt{n})$ (d) $\theta(n \log n)$

4. Match the following :

List-I	List-II
A. Dijkstra's algo	1. Solve all fair shortest path problem.
B. Warshall's algo	2. Constructs a minimum cost spanning tree for a given weighted graph.
C. Prim's algo	3. Solve single source shortest path problem.

   Codes :

   (a) A-1, B-2, C-3 (b) A-2, B-1, C-3 (c) A-3, B-1, C-2 (d) None of these

5. Given the hash function $h(k_i) = h'(k) + i + i^2 \mod 11$ and $h'(k) = k \mod 11$. What is the number of collisions to store the following keys : 23, 12, 19, 11, 33, 16, 46, 37

   (a) 10 (b) 12 (c) 11 (d) None of these

6. S1: Completeness is the set of all decision problems whose solutions can be varified in polynomial time.
   S2: All NP-complete problem are NP-hard, but some NP-hard problems are not known to be the NP-complete, problems can be solved in polynomial time.
   Which statements is/are true ?

   (a) S1 only (b) S2 only (c) Both (d) None of these

7. Let P_r be a problem that belongs to the class NP. Which statement will be TRUE ?

   (a) There is no polynomial time algo for P_r.
   (b) If P_r can be solved deterministically in polynomial time, then P = NP.
   (c) If P_r is NP-hard, then it is NP-complete.
   (d) P_r may be undecidable.

8. We have 8 distinct keys. Now, with these 8 keys. How many distinct BST can be constructed ?

   (a) 714 (b) 715 (c) 716 (d) 1430

9. Let T be a binary search tree with n nodes S_n be the average number of comparisons required for a successfull search and U_n be the average number of comparisons required for an unsuccessful search, then which of the following relations hold true ?

   (a) $S_n = \frac{(U_n + n)}{n-1}$ (b) $S_n = \frac{(U_n + 1)}{n} U_n + 1$

   (c) $S_n = \frac{(n-1)}{n} U_n + 1$ (d) $S_n = \left(\frac{n+1}{n}\right) U_n - 1$

10. Which stack of the following permutations can't be obtained using stack. Input sequence is 1, 2, 3, 4, 5, 6 ?
(a) 3, 2, 1, 5, 4, 6 (b) 5, 4, 3, 2, 1, 6 (c) 3, 2, 1, 6, 5, 4 (d) 3, 4, 5, 6, 1, 2

11. S1: Two stack can be used to implement a single queue.
S2: The elements of a priority queue may be complex structures that are ordered on one or several fields.
Which statements is/are false about queue data structure ?
(a) S1 only (b) S2 only (c) Both (d) None of these

12. A list of n strings, each of length n, is sorted into lexicographic order using merge-sort algorithm. The worst case running time of this computation is approximate to :
(a) $O(n^2)$ (b) $O(n^3)$ (c) $O(n^2 \log n^3)$ (d) $O(n^2\sqrt{n})$

13. A system uses FIFO policy for page replacement it has 4 page frames with no pages loaded to begin with the system first access 96 distinct pages then 4 idle (same) pages, and then access the same 100 pages, but now in the reverse order. How many page fault will occurs ?
(a) 190 (b) 189 (c) 191 (d) None of these

14. Using C-scan scheduling. Assuming currently head at cyclinder 53. The request to access the cylinders occur in following sequences : 53, 65, 67, 122, 124, 183, 14, 37, if it takes 1 ms to move from one cylinder to adjacent one.
(a) 166 (b) 162 (c) 167 (d) None of these

15. We have 5 resources, and resources are shared. We have critical section in program to use these resources, then the critical section is
(a) a piece of code which only one process executes at a time.
(b) a section prone to deadlock.
(c) a piece of code which only a finite number of process executes.
(d) None of the above.

16. Which of these process will finish last ? If 5 units of each resource types available.

Allocation

	x	y	z
P0	1	2	1
P1	2	0	1
P2	2	2	1

Request

	x	y	z
P0	1	0	4
P1	0	1	2
P2	1	2	0

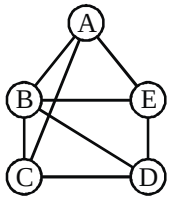
(a) P0 (b) P1 (c) P2 (d) None of these

17. Given a positive number N in base r with an integer part of n digits and a fraction part of m digits, the (r – 1)'s complement of N is defined as :
(a) $r^n - r^m - N$ (b) $r^n - r^{-m} - N$ (c) $r^n + r^{-m} - N$ (d) $r^n - r^m + N$

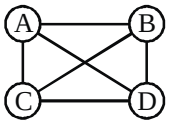
18. S1: A thread comprises a 1-D a program counter, a register set and a stack. If a process has multiple thread of control, it can perform more than one task at a time.
S2: For a computer to start running for instance, it has initial program (i.e., bootstrap program), tends to be simple and is stored in read-access-memory (RAM).
Which statement is/are TRUE ?
(a) S1 only (b) S2 only (c) Both (d) None of these

19. We have a 3-ary max heap having nodes : 9, 5, 6, 8, 3, 1. After inserting 7, 2, 10 keys (nodes) the valid heap array is
(a) 10, 7, 9, 8, 3, 1, 5, 2, 6 (b) 10, 8, 7, 9, 3, 1, 5, 2, 6
(c) 10, 7, 8, 3, 6, 2, 9, 1, 5 (d) 10, 7, 9, 8, 3, 1, 6, 2, 5

20. Which graph is/are planar ?



(I)



(II)

(a) (I) only (b) (II) only (c) Both (d) None of these

21. In a memory map the lowest address of an 16 K byte RAM is 2000H. What will be the highest address ?
(a) 5FFF (b) 6000 (c) 6001 (d) None of these

22. A processor has 90 instructions (distinct) and 44 general purpose registers. A 32-bit instruction has an opcode, two register operands and a immediate operand. The number of bits available for operand is
(a) 14 (b) 13 (c) 12 (d) 15

23. The keys 1, 5, 28, 23, 19, 24, 37, 16, 21, 14 insorted into a hash table. In which collision resolution is done by chaining and hash function is h(k) = k mod 4. What is the length of the longest chain ?
(a) 1 (b) 5 (c) 4 (d) 6

24. Which of the following option is CORRECT ?
(a) Number of odd degree vertices is even. (b) Sum of degree of all vertices is even.
(c) Number of odd degree vertices is odd. (d) Both (a) and (b)

25. Consider the binary relation :
R = {(a, b); (a, c); (c, a); (c, b)}, on the set {a, b, c}. Which one of the following is TRUE ?
(a) R is symmetric, but not antisymmetric. (b) R is not symmetric, but antisymmetric.
(c) R is both symmetric and antisymmetric. (d) R is neither symmetric nor antisymmetric.

26. The expression $[(A \vee B) \wedge (\sim (\sim A \wedge (\sim B \vee \sim R)))] \vee (\sim A \wedge \sim B) \vee (\sim A \wedge \sim R)$ proposition is :
(a) Contigency (b) Satisfiable (c) Tautology (d) Contradiction

27. We have message sequence : w w w x x x x w x y y z x z z y y z y y x x z z y.
Find the number of bits required for huffman encoding of the message.
(a) 50 (b) 51 (c) 49 (d) 52

28. How many distinguishable permutations of the letters in the ALLAHABAD are there ?
(a) 7558 (b) 7560 (c) 7561 (d) None of these

29. The propositional statement : $(A \rightarrow (B \vee C)) \rightarrow ((A \wedge B) \rightarrow C)$ is
(a) Tautology (b) Contradiction (c) Contigency (d) None of these

30. Let G be an arbitrary graph with n nodes and k components. If a vertex is removed from G, the number of components in the resultant graph must necessary lie between
(a) k and n (b) k – 1 and k + 1 (c) k – 1 and n – 1 (d) k + 1 and n – k

31. Consider the program given below :

```
void main ( )
{
    int, i, j, k;
    readln (i, j, k);
    if (i < j) || (i > k);
    {
        writeln ("then part");
        if (j < k);
```

```
        writeln ("j less than k");
        else writeln ("j not less than k");
    }
    else writeln ("else part");
}
```

Determine the cyclomatic complexity ?

(a) 4 (b) 5 (c) 3 (d) None of these

32. Assume a program will experience a total of 200 failures, initial failure intensity is 16 failure/CPU hr. It has now experienced 50 failures.
Determine current failure intensity.
(a) 13 (b) 12 (c) 14 (d) None of these

33. Which of the following pairs of regular expressions are equivalent ?
(i) $1(01)^*$ and $(10)^*1$ (ii) $x(xx)^*$ and $(xx)^*x$ (iii) $(ab)^*$ and a^*b^* (iv) x^+ and $x^* x^+$
(a) (i), (ii) and (iv) (b) (ii), (iii) and (iv) (c) (i), (ii) and (iii) (d) None of these

34. Software deteriorates rather than wears out because
(a) software suffers from exposure to hostile environments.
(b) defects are more likely to arise after software has been used often.
(c) multiple change requests introduce errors in component interactions.
(d) software spare parts become harder to order.

35. Modifying the software to match changes in the ever changing environment is called
(a) adaptive maintenance (b) correctiv maintenance
(c) perfective maintenance (d) preventive maintenance

36. Which of the following is correct arrangement of coupling in order from low or high?
(a) Control, Data, External, Common, Stamp, Content
(b) Data, Control, External,Stamp, ContentCommon
(c) Data, Stamp, Control, External, Common, Content
(d) Stamp,Data, Common,Control, Content, External

37. All the modules of the system are integrated and tested as complete system in one go?
(a) Bottom up testing (b) Top-down testing
(c) Sandwich testing (d) Big-Bang testing

38. Assume that the size of organic type software product has been estimated to be 1000 lines of source code. Assume that the average salary of software engineers be Rs. 15000/per month. Determine the effort required to develop the software product and the nomial development time ?
(a) $(2.4(2.4)^{0.38})*15000$ (b) $(2.5(2.4)^{0.38})*15000$
(c) $(2.5(2.4)^{0.38})*1500$ (d) None of these

39. Match the following :

List-I

A. Determining whether you have built the right system is called
B. Good quality
C. KPA in CMM stands for
D. Reliable

List-II

1. Meet both functional and non function requirement.
2. Software validation.
3. Programm does not fail for specified time in a given environment.
4. Key process area.

Codes :
(a) A-2, B-1, C-4, D-3 (b) A-2, B-1, C-3, D-4
(c) A-2, B-3, C-4, D-1 (d) None of these

40. If $L = \{a^n \mid n \text{ is prime}\}$, then what $L \mid a$

(a) $\{a^n \mid n \text{ is prime}\}$ (b) $\{a^n \mid n \text{ is even}\}$ (c) $\{a^n \mid n \text{ is odd}\}$ (d) None of these

41. If L_1 is the set of all binary strings whose mth symbol from the begining is 1.

L_2 is the set of all binary strings whose nth symbol from the begining is 0.

The minimum number of state in DFA accepting L_1 and L_2 where $m \neq n$.

(a) mn (b) $\max(m, n) + 2$ (c) $m + n$ (d) $m + n + 1$

42. Solve the following assignment problem using Hungerian method. The matrix entries represent the processing time in hours

		1	2	3	4	5 → Operator
	1	9	11	14	11	7
	2	6	15	13	13	10
JOB	3	12	13	6	8	8
	4	11	9	10	12	9
	5	7	12	14	10	14

(a) 40 (b) 38 (c) 36 (d) None of these

43. Which of the following statements is correct ?
(a) Every LPP admits an optimal solution.
(b) A LPP admits unique optimal solution.
(c) If a LPP admits two optimal solution it has an infinite number of optimal solution.
(d) The set of all feasible solution of a LPP is not a converse set.

44. In any simplex table, if corresponding to any negative Δj, all elements of the column are negative or zero, the solution under the test is
(a) degenerate solution (b) unbounded solution
(c) alternative solution (d) non-existing solution

45. Perform 45° rotation of triangle A(0, 0); B(1, 1); C(5, 2) about the origin.

(a) $\left\{(0,0)\left(0,\sqrt{2}\right)\left(\frac{3\sqrt{2}}{2},\frac{7\sqrt{2}}{2}\right)\right\}$ (b) $\left\{(0,0)\left(\sqrt{2},\sqrt{2}\right)\left(\frac{3}{2},\frac{7}{2}\right)\right\}$

(c) $\left\{\left(\frac{3\sqrt{2}}{2},\frac{7\sqrt{2}}{2}\right)(0,0)(0,01)\right\}$ (d) None of these

46. In an entity-relationship (ER) model suppose R is a many-to-one relationship from entity set E_1 to entity set E_2. Assume that E_1 and E_2 participate totally in R and that the cardinility E_1 is greater than cardinality of E_2 Which one of the following is true about R ?
(a) Every entity in E_1 is associated with exactly one entity in E_2
(b) Some entity in E_2 is associated with more than one entity in E_2
(c) Every entity in E_2 is associated with exactly one entity in E_1
(d) None of these

47. An athlete can play on several team and each team needs atleast one player.

Based on the description above, what is the maximum cardinality between each instance of "Athlete" and "team"?

(a) 1 : 1 (b) m : 1 (c) 1 : m (d) m : n

48. The major difference between a more and a mealy machine is the output gone former depends
(a) Only on the present input
(b) Only on the present state
(c) Only on the present state and present input
(d) none of these

49. The capacity of a binary symmetric channel (BSC) with cross-over probability 0.5 is ?
(a) 0 (b) 2 (c) 1 (d) none of these

50. Consider the following grammar :

$A \rightarrow BA'$

$A' \rightarrow +BA' / \in$

$B \rightarrow CB'$

$B' \rightarrow *CB' / \in$

$C \rightarrow (A) / id$

The follow (B) is

(a) {), $} (b) {+,), $ } (c) {(, id} (d) None of these

51. What is the minimum number of starts of DFA accepting $(111 + 11111)^*$
(a) 5 (b) 6 (c) 9 (d) None of these

52. Apply the cohen sutherland algorithm to clip the line P(70, 20) to Q(100, 10) against a window whose LLC is at (50, 10) and URC is at (80, 40). Which of the follwoings true?
(a) The protion of the line which is inside the window is from (70,20) to (60, 16.66)
(b) The protion of the line which is inside the window is form (1000, 10) to (80, 16.66)
(c) The portion of the line which is inside the window is form (70, 20) to (80, 16.66)
(d) The line is completely outside the window

53. How many frames are used in a one hour animation film?
(a) 86500 (b) 86400 (c) 87663 (d) 98120

54. Consider a discrete memory less source with S = (X,Y,Z) with probabilities P = (0.6,0.2,0.2) Find the interval for the message XYZ?
(a) [.696,72) (b) [.672,696) (c) [.600,.672) (d) .696, .704)

55. Which of the following statement is FALSE?
(a) The code C = (0000, 1010,0101, 1111) is an LBC having minimum distance 2.
(b) If a Code C has minimum distance 9 then it can detect upto 8 bit of error and correct upto 4 bit of error.
(c) If G and H are generator and Parity Check matrix respectively then $GH^T = 0$
(d) None of the above

56. Consider the language L given by the regular expression $(a + b)^* b(a + b)$ over the alphabet $\{a, b\}$. The smallest number of states needed in a deterministic finite state automation (DFA) accepting L is
(a) 2 (b) 3 (c) 5 (d) 4

57. A byte addressable computer a memory capacity of 2^m bytes, and can perform 2^n k operations. On instruction involving 3 operands and one operator needs a maximum of
(a) 3m + n (b) m + 3n + 10 (c) 3m + n + 10 (d) None of these

58. S1: More than one word are put in one cache block to exploit the spatial locality of reference in a program.
S2: Virtual memory reduces the context switching overhead.
Which statements is/are TRUE ?
(a) S1 only (b) S2 only (c) Both (d) None of these

59. What is the value of C * A ? where C = A * B and A * B, where * is boolean operation defined by A * B = AB + A′B′.
(a) A (b) B (c) 0 (d) 1

60. The minimum number of D flip-flops needed to design a mod-256 counter is
(a) 9 (b) 8 (c) 256 (d) 255

61. What will be the output of code sigment?

```
Fun ( )
{
int x = 2 ; y = 4 ;
    if (x & y) | | (x – 2)
    printf (“%d”, x) ;
    printf (“%d”, y) ;
}
```

(a) 24 (b) 2 (c) 4 (d) None of these

62. What will be the output of code sigment?

```
x = 5, y = 5;
if (x > 4 | | y++)
print(y) ;
if (x > 4 | | ++y)
print(y)
```

(a) 56 (b) 55 (c) 57 (d) 67

63. What will be the output of code sigment?

```
Const int var = 5 ;
int * ptr ;
ptr = & var ;
* ptr = 6 ;
printf (“%d%d”, var, *ptr) ;
```

(a) 5, 6 (b) 5, 5 (d) 6, 6 (d) None of these

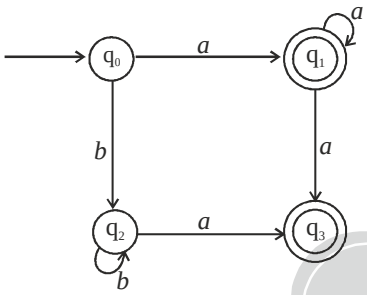
64. ATM-based networks are preferred to their STM counterparts , because of
(a) cost advantages giving an economically attractive implementation .
(b) the allowance for increased link capacity utilization and dynamic bandwidth control.
(c) the fact that ATM can handle real-time demand whereas STM cannot.
(d) the fact that restoration in STM is in practice impossible.

65. Consider a fuzzy set A defined on the interval x=[0,10] of integers by the membership function.
$\mu A(x) = x / x+2$
α cut corresponding to $\alpha = 0.5$ will be
(a) { 0,1,2,3,4,5,6,7,8,9,10} (b) {1,2,3,4,5,6,7,8,9,10}
(c) {2,3,4,5,6,7,8,9,10} (d) { }

66. Consider a fuzzy set old as defined below, old ={(20,0),(30,0.2),(40,0.4),(50,0.6),(60,0.8),(70,1),(80,1)}. Then the alpha-cut for alpha = 0.4 for the set old will be
(a){(40,0.3)}
(b){50,60,70,80}
(c){(20,0.1),(30,0.2)}
(d){(20,0),(30,0),(40,1),(50,1),(60,1),(70,1),(80,1)}

67. Multilayer neural network uses
(a) Linearly seprable function only (b) Non-linearly seprable function only
(c) Linearly or non-linearly seprable (d) None of these

68. Consider the following NFA



The number of states and one number of final states in the DFA are
(a) 4,2 (b) 5,2 (c) 6, 3 (d) None of these

69. Interrupt which are initated by instruction is _____ and the register that stores all interrupt request is _____
(a) software, interupt request register (b) Internal, interupt mask register
(c) External, status register (d) None of these

70.

List - I	**List- II**
(1) Implied	(i) Specified implicity in the definition of instruction
(2) Indexed	(ii) Register specifies the address of operand
(3) Base-Indexed	(iii) Addressing memory by giving a register plus a context off set.
(4) Register indirect	(iv) Memory address is computed by adding up two registers plus an (optional) offset.

(a) 1 – i, 2– ii, 3 – iii, 4 – iv (b) 1 – i, 2 – iii, 3 – ii, 4 – iv
(c) 1 – i, 2 – iii, 3 – iv, 4 – ii (d) 1– i, 2 – ii, 3 – iv, 4 – iii

71. S_1: The mechanism that binds together code and data is called encapsulation.
S_2: "One method multiple Interface" i.e. allows one interface to controll access to a general class of actions is called polymorphism.
S_3: Inheritance is the process by which one object can acquire the properties of another object.
Which is/are statements are false.
(a) i only (b) ii only (c) iii only (d) all of the above

72. In C++

(1) by default all variable is private	(i) Structure
(2) is public by default all variable	(ii) Union
(3) at a time only one varible can be handled	(iii) Class
(4) object are stored in .....contiguous way	(iv) Array

(a) 1 – iii, 2 – i, 3 – ii, 4 – iv (b) i – iii, 2 – ii, 3 – i, 4 – iv
(c) 1 – iv, 2 – ii, 3 – iii, 4 – i (d) 1– iii, 2 – ii, 3 – i, 4 – iv

73. The order in which operands are evaluated in expression is predictable if the operator is
(a) * (b) + (c) % (d) &&

74. Which of the following comments about inline commetns is true?
(a) A function is declared inline by typing the keyword inline before the return value of the function
(b) A function is declared inline by typing the keyword inline after the return value of the funciton.
(c) A function that is declared inline must be treated inline
(d) none of these

75. Consider the following sorting algorithms
(1) Quicksort (2) Heapsort (3) Mergesort
Which of them perform in least time in the worst case?
(a) 1 and 2 only (b) 2 and 3 only (c) 3 only (d) 1, 2 and 3

76. What is the minimum number of resources required to ensure deadlock will never occur, if there are currently three process P_1, P_2 and P_3 running in a system whose maximum demand for the resources of same type are 3, 4 and 5 respectively
(a) 3 (b) 7 (c) 9 (d) 10

77. Dirty bit is used to indicate which of the following?
(a) A page fault has occurred
(b) A page has corrupted data
(c) A page has been modified after being loaded cache
(d) An illegal access of page

78. Consider the following declaration
int a, *b = &a, **C = &b;
The following program fragment
(a) does not change the value of a (b) assign address of c to a
(c) assigns the value of b to a (d) assigns 5 to a

79. Consider the following code segment.
```
void foo(int x, int y)
{   x+ = y;
    y+ = x; }
main ( )
{   int x = 5.5;
    foo(x,x); }
```
What is the final values of x in both call by value and call by reference, respectively in the main function?
(a) 5 and 16 (b) 5 and 15 (c) 5 and 20 (d) 5 and 5

80. For a binary half-sbtractor having two inputs A and B, the correct set of logical outputs D (=A minusB) and X(= borrow) are -

(a) $D = AB + \overline{A}B, X = \overline{A}B$ (b) $D = \overline{A}B + A\overline{B}, X = A\overline{B}$

(c) $D = \overline{A}B + A\overline{B}, X = \overline{A}B$ (d) $D = AB + \overline{A}B, X = A\overline{B}$

81. A priority queue is implemented as a Maxheap. Initially it has 5 elements. The level order traversal of the heap is 10, 8, 5, 3, 2. Two new elements '1' and '7' are inserted into the heap in that order. The levelorder traversal of the heap after the insertion of the elements is
(a) 10, 8, 7, 5, 3, 2,1 (b) 10, 8, 7, 2, 3, 1,5
(c) 10, 8, 7, 1, 2, 3,5 (d) 10, 8, 7, 3, 2, 1,5

82. What is/are true?
S_1: Semantic nets have the ability to represent default values for categories
S_2: In goal stack Planning, the Problem solver makes use of Goal stack planning, The problem solver makes use of Goal stack (GS) that contains both subgoals and actions that have been proposed to satisfy those subgoals.
(a) S_1 only (b) S_2 only (c) both (d) None

83. Which is/are a horne clause??

(i) $\neg P \rightarrow \neg(Q \wedge R)$ (ii) $(P \wedge Q) \rightarrow (RV \neg S)$ (iii) $P \rightarrow QVR$

(a) i & iii (b) i & ii (c) ii & iii (d) all of these

84. We have two sentance :

i. likes (Ram, y)

ii. likes (x, sita)

we apply two substitution for unification

1. y/sita, x/Ram
2. Ram/sita, y/Ram, x/Ram

Which substitutions is/are valid?

(a) 1 only (b) 2 only (c) both (d) None of these

85. Consider the Prolog code

a(1)
b(1)
a(2)
b(2)
b(3)
c(x,y): a(x),!, b(y)

How many pairs of (x, y) value takes in ? C(x, y).

(a) 3 (b) 6 (c) 5 (d) None of these

86. After the execution of CMPA instruction

(a) ZF is set and CY is reset (b) ZF is set and CY is unchanged

(c) ZF is reset and CY is set (d) ZF is reset and CY is unchanged

87. Consider the following program fragment

```
START   :   MVI C, FFH
            INX B
LOOP    :   ADD B
            DCR C
            JAZ   LOOP
            HLT
```

Loop will be executed

(a) 255 times (b) only one time (c) 256 times (d) Forever

88. In an IPv4 packet the value of HLEN is 1010 in binary, let the total length and fragmentation offset value are 200 and 100 respectively. Then find the initial and last byte of data carried by packet

(a) 1600, 1759 (b) 800, 960 (c) 800, 959 (d) number of these

89. In a RSA cryptosystem a participant A use two prime numbers p = 13 and q = 17 to generate new public and private keys, if the public key of A is 35. Then the private key of A is

(a) 09 (b) 11 (c) 21 (d) None of these

90. Maximum data rate achieverable for a noiseless 13 KHz binary channel is

(a) 13000 bps (b) 26 kbps (c) 5200 bps (d) None of these

91. Consider the given schemes.

Branch_scheme = (Branch_name, assets, Branch_city)
Customer_scheme= (Customer_name, street, Customer_city)
Deposit_scheme = (Branch_name, account_number, Customer_name, balance)
Borrow_scheme = (Branch_name, loan_number, Customer_name, amount)
Client_scheme = (Customer_name, banker_name)

Using relation algebra, the query that find customers who have a balance of over 1000 is

(a) $\pi_{customer\_name}\ (\sigma_{balance>1000}(Deposit))$

(b) $\sigma_{customer\_name}\ (\pi_{balance>1000}(Deposit))$

(c) $\pi_{customer\_name}\ (\sigma_{balance>1000}(Borrow))$

(d) $\sigma_{customer\_name}\ (\pi_{balance>1000}(Borrow))$

92. Consider the set of relations given below and the SQL query that follows:
Sutdents: (Roll_number, Name, Date_of_birth)
Courses: (Course_number, Course_name, Instructor)
Grades: (Roll_number, Course_number, Grade)

```
SELECT DISTINCT Name
FROM  Students, Courses, Grades
WHERE Students. Roll_number = grades. Roll_number
    AND  Courses.Instructor = Korth
    AND  Courses. Course_number = Grades.Course_number
    AND   Grades. Grade = A
```

Which of the following sets is computed by the above query?
(a) Names of students who have got an A grade in all courses taught by Korth
(b) Names of students who have got an A grade in all courses
(c) Names of students who have got an A grade in at least one of the courses taught by Korth
(d) None of the above

93. Which of the following schedules are *S*: $R_1(x), R_2(x), W_1(x)W_2(x)$, $commit_2$, $commit_1$.
(i) Recoverable (ii) Case cadeless (iii) Strict
(a) (i) & (iii) (b) (ii) & (iii) (c) (i) & (ii) (d) none of these

94. Let R(ABCDE) be a relational schema and $F = \{AB \rightarrow CD, ABC \rightarrow E, C \rightarrow E\}$ be the set of functional depenencies, what is the normal form of R ?
(a) 1NF (b) 2 NF (c) 3NF (d) BCNF

95. Match the following

List- I	List- II
A. Data link layer	1. The lowest layer whose function is to activate and maintain the circuit between DTE and DCE
B. Physical layer	2. Performs routing and communication
C. Presentation layer	3. Detection and recovery form errors in the transmitted data
D. Network layer	4. Concerned with for the syntax of the data

Codes

	A	B	C	D
(a)	3	1	4	2
(b)	2	1	4	3
(c)	4	1	2	3
(d)	none of these			

96. Let R(ABCDE) be a relational scheme and $F = \{AB \rightarrow CD, ABC \rightarrow E, C \rightarrow A\}$ be the set funcitonal dependencies. The number of candidate keys is
(a) 1 (b) 2 (c) 3 (d) none of these

97. Which protocal is used to convert IP addresses to MAC address
(a) IP (b) RARP (c) In ARP (d) ARP

98. Given an IP address 201.14.78.65 and the subnet mask 255.255.255.224. What is the subnent address?
(a) 201.14.78.64 (b) 20.14.78.65 (c) 201.14.77.64 (d) none of these

99. A 200 kbps satellite link has a propagation delay of 400 ms. The transmitter employs the " go back n ARQ" scheme with n set to 10. Assuming that each frame is 1000 bytes long, what is the maximum datarate possible ?
(a) 50 kbps (b) 100 kbps (c) 150 kbps (d) 200 kbps

100. If 100100 data to be sent and devisor is 1101 in CRC then what would be received data if no error occurs?
(a) 100100100 (b) 100100001 (c) 1001000 (d) none of these

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Test Series-E

ANSWER KEY OF PAPER – I

1. (a)	**2.** (c)	**3.** (c)	**4.** (d)	**5.** (c)
6. (c)	**7.** (c)	**8.** (a)	**9.** (b)	**10.** (b)
11. (b)	**12.** (b)	**13.** (a)	**14.** (c)	**15.** (b)
16. (b)	**17.** (b)	**18.** (c)	**19.** (a)	**20.** (c)
21. (d)	**22.** (c)	**23.** (b)	**24.** (a)	**25.** (c)
26. (d)	**27.** (b)	**28.** (b)	**29.** (c)	**30.** (d)
31. (c)	**32.** (d)	**33.** (b)	**34.** (c)	**35.** (d)
36. (c)	**37.** (b)	**38.** (d)	**39.** (d)	**40.** (d)
41. (a)	**42.** (d)	**43.** (d)	**44.** (b)	**45.** (c)
46. (b)	**47.** (d)	**48.** (a)	**49.** (a)	**50.** (b)

ANSWER KEY OF PAPER – II

1. (c)	**2.** (c)	**3.** (d)	**4.** (c)	**5.** (d)
6. (c)	**7.** (c)	**8.** (d)	**9.** (d)	**10.** (d)
11. (d)	**12.** (c)	**13.** (c)	**14.** (c)	**15.** (c)
16. (d)	**17.** (b)	**18.** (a)	**19.** (a)	**20.** (c)
21. (a)	**22.** (b)	**23.** (c)	**24.** (d)	**25.** (d)
26. (c)	**27.** (a)	**28.** (b)	**29.** (c)	**30.** (c)
31. (a)	**32.** (b)	**33.** (a)	**34.** (b)	**35.** (a)
36. (c)	**37.** (d)	**38.** (b)	**39.** (a)	**40.** (d)
41. (b)	**42.** (b)	**43.** (c)	**44.** (b)	**45.** (a)
46. (a)	**47.** (d)	**48.** (c)	**49.** (a)	**50.** (b)
51. (c)	**52.** (c)	**53.** (b)	**54.** (a)	**55.** (d)
56. (d)	**57.** (c)	**58.** (a)	**59.** (b)	**60.** (b)
61. (c)	**62.** (b)	**63.** (d)	**64.** (b)	**65.** (c)
66. (d)	**67.** (c)	**68.** (c)	**69.** (a)	**70.** (c)
71. (b)	**72.** (a)	**73.** (d)	**74.** (a)	**75.** (b)
76. (d)	**77.** (c)	**78.** (d)	**79.** (c)	**80.** (c)
81. (d)	**82.** (a)	**83.** (c)	**84.** (b)	**85.** (a)
86. (a)	**87.** (c)	**88.** (c)	**89.** (b)	**90.** (b)
91. (a)	**92.** (c)	**93.** (d)	**94.** (b)	**95.** (a)
96. (b)	**97.** (d)	**98.** (a)	**99.** (b)	**100.** (b)