TEST SERIES UGC-NET/JRF JULY 2018

BOOKLET SERIES D

Paper Code 87

Test Type: *TEST SERIES*

COMPUTER SCIENCE & APPLICATIONS

Duration: 03:10 Hours

Date: 29-06-2018

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

1. Which of the following does not form a part of CPU ?
   (a) Control unit   (b) Hard disk   (c) Memory   (d) None of these

2. A disk where number of sector are fixed is called
   (a) Floppy   (b) CD   (c) Hard sectored   (d) Soft sectored

3. Which memory is fastest ?
   (a) Auxilliary   (b) Buffer   (c) Hard disk   (d) Optical device

4. Program of a computer presented as a sequence of instructions in the form of binary numbers is called_____ language.
   (a) Mathematical   (b) Assembly   (c) High level   (d) Machine

5. What is the decimal equivalent of $(10100011)_2$.
   (a) 160   (b) 162   (c) 163   (d) 165

READ THE PASSAGE AND ANSWERS [Q. 6 - Q. 10] :

Health is neither a commodity to be purchased nor a service to be given ; it is a process of knowing, living, participating and being says the blueprint of India's recently reformulated National Health Policy. The former Prime Minister Smt. Indira Gandhi further explained "life is not merely for living, but for living in health". In India, even in very ancient times, it was believed that physical, mental and spiritual health were intrinsically interwoven. This is the basis of the science of yoga. The medical system perfected in India, 'Ayurveda' or the knowledge of the span of life, in many ways foreshadowed W.H.O. own definition of health as a "State of complete physical, mental and social well being".

Modern health care properties of the government of India are estrined in the Indian constitution which says, 'the state shall regard the raising of the level of nutrition and the standard of the living of its people and the improvement of public health as among its primary duties. "While indigenous medical systems like the 'Ayurveda', 'Unani' and 'Siddha' or nature cure are widely practised and believed in by a great mass of people, particularly in rural India, mainly for their accessibility and low costs and an element of faith based on respect for their ancient traditions, it is allopathy, or modern medicine as we know it, that has been the chief beneficiary of government policy in India. Homeopathy, the alternative medical system founded by the German Scientist S.C.F. Hahnemann in 1796, is taught at 123 institutions and is also patronised. As in China, where acupuncture, their indigenous medical system, flourished along side medical technique, so in India, the government uncourages proper standardised use of indigenous systems while laying stress on allopathy. Infact there are about 2,81,000 registered practitioners of India systems of medicine, 19687 dispensaries and 12,865 beds in 941 hospitals providing such treatment and a total of 98 'Ayurvedic' 17 'Unani' and one 'Siddha' undergraduate colleges in India of which 54 'Ayurvedic' and 11 'Unani' colleges are run by voluntary agencies affiliated to universities which have degree and diploma courses of 5 and 3 years and post-graduate facilities. The practice and education by 'Ayurveda', 'Unani' and 'Siddha' is regulated by the central council of Indian Medicine.

6. According to the author the science of yoga believes that
   (a) one must practise Indian system of medicine.
   (b) Good can be realised through keeping one self morally fit.
   (c) True health stands for physical, mental and spiritual well being.
   (d) Mans untimate goal is self realization and that is possible only through maintenance of perfect health.

7. In what order have the following system of medicine been mentioned in the passage
   I. Unani   II. Homeopathy   III. Allopathy
   IV. Ayurveda   V. Siddha
   (a) I, II, III, IV, V   (b) II, III, IV, V, I   (c) III, IV, V, I, II   (d) IV, I, V, III, II

8. According to the passage, which of the following is not true about homeopathy ?
   (a) It is a medical system founded by german scientists S.C.F. Hahnemann.
   (b) It is an indigenous medical system widely practised in rural India.
   (c) Tries system was founded in the 18th century.
   (d) It is patronised by the government of India.

9. Acupuncture is the indigenous medical system of
   (a) German   (b) Japan
   (c) Both China and India   (d) China

10. The title below that best expresses the ideas of the passage is
    (a) Indian system of medicine vs foreign system of medicine.
    (b) Medical education in India.
    (c) Public health in India.
    (d) National health Policy.

Question [11 - 15] study the following given graphs and answer the questions :
Distribution of Male population statewise
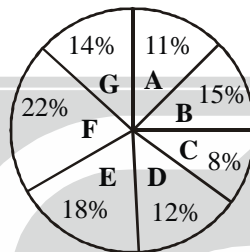
Total Male population = 39 Lakhs.

Distribution of Female population statewise
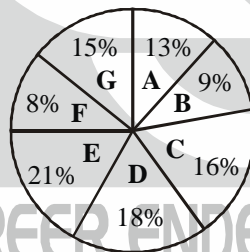
Total Female population = 32 Lakhs.

11. What is the ratio between male population and female population respectively of the states A and B jointly ?
    (a) 704 : 507   (b) 507 : 204   (c) 352 : 507   (d) 507 : 352

12. What is ratio between the female population of state G and male population of state E respectively ?
    (a) 39 : 40   (b) 40 : 39   (c) 17 : 18   (d) None of these

13. What is the population of state F in lakhs ?
    (a) 11.14   (b) 8.58   (c) 6.52   (d) 14.11

14. How much percent is the female population of the state C of the total population of same state ? [Approx.]?
    (a) 48   (b) 56   (c) 62   (d) 59

15. What is the average population approximately of the given states (in lakhs) ?
    (a) 6.5   (b) 8   (c) 4.6   (d) 10

16. Percentage of knowledge gained through observation is?
    (a) 75 %   (b) 50 %   (c) 34%   (d) None

17. The base on which the subject activities and experience are planned is called?
    (a) Course   (b) Behavior   (c) Design   (d) Logical sequence

18. What is Curriculum?
    (a) Overall activities of an Institution
    (b) Objectivity
    (c) Classroom
    (d) Affective

19. Which domain of objectives is not being evaluated through our present system of examination?
    (a) Objectivity
    (b) Classroom
    (c) Affective
    (d) Students

20. You are teaching a topic in class and a student ask a question unrelated to the topic. What will you do ?
    (a) you will allow him to ask unrelated question
    (b) you will not allow him to ask unrelated question
    (c) you will consider it indiscipline and punish him
    (d) you will answer the question after the class

21. A researcher should always:
    (a) Know everything in his area
    (b) Know about sub-area
    (c) Wait for an inspiration
    (d) None of the above

22. Which of the following best sums up the objective of hypothesis?
    (a) It places clear goals for the researcher
    (b) It prevents the researcher from undertaking blind research
    (c) It enables the researcher to draw conclusions.
    (d) It lays down the rules for undertaking the research

23. One undertakes research for which of the following purpose?
    (a) To verify what has been established
    (b) To refute some assumptions
    (c) To describe a new phenomenon
    (d) Either of a, b or c

24. Research promises advancement of knowledge but discoveries are rare bee
    (a) Research is a critical, continuous investigation
    (b) Researchers are not creative enough to solve problems
    (c) Sustained effort at research is lacking these days
    (d) Most people lack the aptitude for research

25. Bibliography given in a research report
    (a) Helps those interested in further research and studying the problem from an angle.
    (b) Shows the vast knowledge of the researcher
    (c) Makes the report authentic
    (d) None of the above

26. Which of the following can monitor air pollution?
    (a) Algae
    (b) Fungi
    (c) Lichens
    (d) Bacteria

27. Which of the following is the correct order for actions for reducing non-biodegradable waste?
    1. Reduce
    2. Reuse
    3. Recycle
    (a) 1-2-3
    (b) 1-3-2
    (c) 2-1-3
    (d) 2-3-1

28. Which of the following is the second most important green house gas?
    (a) Methane
    (b) CFC
    (c) Ozone
    (d) Nitrous Oxide

29. Consider the following Statements regarding Loktak Lake:
    1. It is famous for the floating vegetation phumdis& KeibulLamjao National Park, home of endangered Sangai Deer is also one of Phumdis in the lake.
    2. It was designated as a wetland of international importance under the Ramsar Convention.
    3. It is not listed under the Montreux Record.
    Identify the correct statements:
    (a) 1 & 2 only
    (b) 2 & 3 only
    (c) 1 & 3
    (d) 1, 2 and 3

30. Consider the following Statements regarding NamamiGangeProgramme (NGP):
    1. It was launched by Ministry of Water Resources, River Development & Ganga Rejuvenation.
    2. The program would be implemented by the National Mission for Clean Ganga (NMCG) and its state counterpart organizations.
    3. It replaced Ganga Action Plan
    Identify the correct statements:
    (a) 1, 3 only   (b) 2, 3 only   (c) 1, 2 only   (d) All of the above

31. There are different arguments given in a favour of power sharing in a democratic political system. Which one of the following is not one of them?
    (a) It reduces conflict among different communities
    (b) Major community does not impose its will on others
    (c) Since all are affected by the policies of the government, they should be consulted in the governance of the country
    (d) It speeds up the decision making process and improves the chances of unity of the country

32. Which of the following is known as the blue print of Indian Constitution?
    (a) Gov Of India Act 1909   (b) Govt Of India Act 1935
    (c) British Constitution   (d) Constitution of USA

33. The most essential feature of the Parliamentary form of Government is the
    (a) sovereignty of the Parliament
    (b) written Constitution
    (c) accountability of the executive to the legislature
    (d) independent judiciary

34. AICTE act 1987 aslo has a provision for setup of
    (a) NAAC   (b) Quality Council of India
    (c) Distance Education Council   (d) NBA

35. Which of the following state has highest number of central universities?
    (a) Bihar   (b) Delhi   (c) Telangana   (d) UP

36. Listening to a lecture is
    (a) information Listening   (b) evaluative listening
    (c) emphatic Listening   (d) none of these

37. Listening is badly affected by
    (a) message overload-excess of listened material
    (b) high speed of speaking
    (c) a sizable hearing loss-physiological problem
    (d) all of the above

38. What are the barriers to effective communication?
    (a) Moralising, being judgemental and comments of consolation.
    (b) Dialogue, summary and self-review.
    (c) Use of simple words, cool reaction and defensive attitude.
    (d) Personal statements, eye contact and simple narration.

39. Every type of communication is affected by its :
    (a) Reception   (b) Transmission   (c) Non-regulation   (d) Context

40. The function of mass communication of supplying information regarding the processes, issues, events and societal developments is known as :
    (a) content supply   (b) surveillance   (c) gratification   (d) correlation

41. One morning Udai and Vishal were talking to each other face to face at a crossing. If Vishal's shadow was exactly to the left of Udai, which direction was Udai facing ?
    (a) East   (b) West   (c) North   (d) South

42. Pointing to a photograph of a boy Suresh said, "He is the son of the only son of my mother". How is Suresh related to that boy ?
    (a) Brother   (b) Uncle   (c) Cousin   (d) Father

43. Look at this series : 8, 6, 9, 23, 87,.... What number should come next ?
    (a) 128   (b) 226   (c) 324   (d) 429

44. In a box, there are 8 red, 7 blue and 6 green balls. One ball is picked up randomly. What is the probability that it is neither red nor green ?
    (a) 1/3   (b) 3/4   (c) 7/19   (d) 9/21

45. A person's present age is two-fifth of the age of his mother. After 8 years, he will be one-half of the age of this mother. How old is the mother at present ?
    (a) 32 years   (b) 36 years   (c) 40 years   (d) 48 years

46. Two students appeared at an examination. One of them secured 9 marks more than the other and his marks was 56 % of the sum of their marks. The marks obtained by them are :
    (a) 39, 30   (b) 41, 32   (c) 42, 33   (d) 43, 34

47. A train 125 m long passes a man, running at 5 km/hr in the same direction in which the train is going, in 10 seconds. The speed of the train is
    (a) 45 km/hr   (b) 50 km/hr   (c) 54 km/hr   (d) 55 km/hr

48. In certain code COMPUTER is written as RFUVQNPC. How is MEDICINE written as in the same code?
    (a) EOJDJEFM   (b) EOJDEJFM   (c) MFEJDJOE   (d) MFEDJJOE

49. Complete the letter series : CMM, EOO, GQQ, _____, KUU
    (a) GRR   (b) GSS   (c) ISS   (d) ITT

50. If "All boys are bad" statement is false, which of the following is claimed to be true ?
    (a) Some boys are bad   (b) No boys are bad
    (c) Some boys are not bad   (d) None of these

PAPER – II

1. Match the following for Unix system calls
   List-I
   (A) exec
   (B) brk
   (C) wait
   (D) fork

   List-II
   (i) Create a new process
   (ii) Invokes another program overlaying memory space with a copy of an executable file
   (iii) To increase or decrease the size of data region
   (iv) A process synchronizes with termination of child process

   (a) A-ii, B-iii, C-iv, D-i   (b) A-iii, B-ii, C-iv, D-i
   (c) A-iv, B-iii, C-ii, D-i   (d) A-iv, B-iii, C-i, D-ii

2. _____ maintains the list of free disk blockes in the unix file system
   (a) i-nod   (b) boot block   (c) super block   (d) file allocation table

3. Requirements analysis is critical to the success of a development project.
   (a) True   (b) False
   (c) Depends upon the size of project   (d) None of the mentioned

4. Which one of the following models is not suitable for accommodating any change?
   (a) Build & Fix Model   (b) Prototyping Model
   (c) RAD Model   (d) Waterfall Model

5. To use the UNIX system with a GUI you need this type of window to enter unix commands
   (a) Terminal   (b) Dialog box   (c) DOS   (d) Command

6. The _____objects values that can be testted for various error conditions
   (a) orstream   (b) ofstream   (c) stream   (d) ifstream

7. To overload an operator _____ keyword must be used along with the operator to be overloaded
   (a) over   (b) overload   (c) void   (d) operator

8. What is the O/P of the program
   ```
   #include<iostream.h>
   void main ( )
   {
    int n = 1;
   cout << endl <<"The number are"
   do { n++;
   cout <n<< "\t";
           n++;  }
           while (n < =100);
                   cout <<endl;
   }
   ```
   (a) The numbers are 1 to 99   (b) The numbers are 0 to 99
   (c) The numbers are to 100   (d) None of the above

9. What is the name of the method used to start a thread execution?
   (a) int();   (b) start();   (c) run();   (d) resume();

10. What will be the O/P of the program?
```
try{
        int x = 0;
        int y = 5/x;
}
        catch (Exception e)
        {
             system.out.println "Exception";
        }
             catch (Arithematic Exception ae)
             {
                  {
                        system.out.println "Arithematic Exception";
                  }
                       { system.out.printout "Finished";}}
```
    (a) Finished   (b) Exception   (c) Compilation fails   (d) Arithemetic exception

11. Which of the following is/are the header files listed in C++ standard library
    (A) <ctype.h>   (B) <float.h>   (C) <data.h>   (D) <limits.h>
    (a) A, B, C only   (b) A, B, D only   (c) B, C, D only   (d) A, B, C, D

12. class derived:Public base1, public base2
```
{
        _____
        _____
        _____
        _____
}  is an example of
```
    (a) Hierarchical inheritance   (b) Multi-level inheritance
    (c) Polymorphic inheritance   (d) None of the above

13. If default constructor is not defined, then how the objects of the class will be created?
    (a) The compiler will generate erro
    (b) Error will occur at run time
    (c) Compilor provides its default constructor to build the object
    (d) None of the above

14. Maximize

    $4 x_1 + 3 x_2$

    $x_1 - 6 x_2 \leq 5$

    $3 x_1 \leq 11$

    $x_1, x_2 \geq 0$

    (a) Optimal   (b) Unbounded   (c) Infeasible   (d) Alternate optimal

15. Selection of a model is based on
    (a) Requirements   (b) Development team & Users
    (c) Project type and associated risk   (d) All of the mentioned

16. Below is the initial basic feasible solution for the problem

	A	B	C	
I	3	1	8	12
II	9	4	0	14
III	17	6	7	4
	9	10	11	

is given as,

	A	B	C
I	9	3	
II		7	7
III			4

Find the optimal solution
(a) 74   (b) 84   (c) 80   (d) 76

17. While converting a primal to dual counter part,
(a) Maximization problem is converted to minimization problem.
(b) Number of constraints is equal to number of variables.
(c) The right hand side of constraint becomes the co-efficient of objective function.
(d) All of the above.

18. If there are n devices (nodes) in a network, what is the number of cable link required for a mesu and star topoloogy.

(a) $n, n-1$ (b) $\dfrac{n(n-1)}{2}, n$ (c) $n-1, n$ (d) $n-1, \dfrac{n(n-1)}{2}$

19. IP address = 125.134.112.66
    Mask = 255.255.224.0
    What is the first address?
    (a) 125.134.96.0   (b) 125.134.112.0   (c) 125.134.112   (d) 125.134.0.0

20. A 3000 Km long trunk is used to transmit frames using Go-back n protocol. The propagation speed is 64 km/sec and trunk data rate is 1.544 mbps. Frame size is 64 byte. In ordes to achieve an efficiency of 100 %. What is the maximum window size at the Receiver side.
    (a) 32   (b) 63   (c) 1   (d) 110

21. In a datalink layer protocol the Flag bit pattern is given as 0111. Assuming that bit stuffing is employed the transmitter sends the data sequence 01110110 as
    (a) 0110101110   (b) 011010110   (c) 0111011000   (d) 0110100100

22. Which network protocol allows hosts to dynamically get a unique IP number on each boot up
    (a) RARP   (b) BootP   (c) DHCP   (d) ARP

23. What is the maximum size of data that application layer can pass on the TCP layer below?
    (a) Any size   (b) 2^{16} – the size of TCP header
    (c) 2^{16} byte   (d) 150 byte

24. Which layer is responsible to add the preamble and SFD in frame?
    (a) Transport layer   (b) Physical layer   (c) Netwrok layer   (d) Data link layer

25. What is the name of protocol used to eliminate the loops?
    (a) Switching protocol   (b) ISL
    (c) Spanning tree protocol   (d) None of the above

26. Consider sets A, B and C such that $|A|, |B|, |C| \geq 0$

    1. $A \cap (B - A) = \phi$ 2. $A - C \subseteq A - B - C$ 3. $(A \cap B) \cup (A \cap \overline{B}) = A$

    4. $(A - C) \cap (C - B) = \phi$

    Which of the above statements is/are always True?

    (a) 1 and 3   (b) 1, 2 and 3   (c) 2 and 4   (d) 1, 3 and 4

27. Consider the following Lattice :
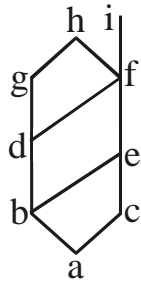
    What is the greatest lower bound of (h, f)?

    (a) f only   (b) d only   (c) d and f only   (d) none of these

28. Which of the following is false?

    (a) $\sim (p \Leftrightarrow q) \equiv (\sim p) \Leftrightarrow q \, (or) p \Leftrightarrow (\sim q)$

    (b) $\sim (p \Rightarrow q) \equiv \sim ((\sim p) \vee q)$

    (c) $(p \wedge q) \vee \sim (p \wedge q) \equiv \sim f$, (f is a contradiction)

    (d) $p \Leftrightarrow q \Rightarrow q \Leftrightarrow p$ is a contradiction

29. Consider the set $A = \{\pm 1, \pm i\}$, and * denotes the multiplication (A, *) forms

    (a) Only a subgroup   (b) Only a monoid   (c) A group   (d) None of these

30. Consider the sequence: $a = 1, 3, 9, \ldots\ldots 3^n, \ldots\ldots$

    The generating function f(x) for the given sequence is

    (a) $\dfrac{3}{1-x}$ (b) $\dfrac{1}{1-3x}$ (c) $\dfrac{3}{1+x}$ (d) $\dfrac{1}{1+3x}$

31. The circuit shown below is used to implement the function $z = f(A, B) = \overline{A} + B$. The values of P and Q are
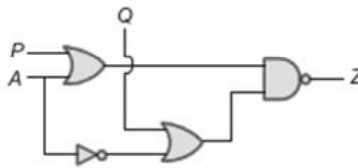
    (a) $P = A, Q = B$ (b) $P = B, Q = \overline{A}$ (c) $P = \overline{B}, Q = O$ (d) $P = O, Q = \overline{B}$

32. The minimized expression for the given K-map (X: don't care) is

CD \ AB	00	01	11	10
00	1	0	1	1
01	0	X	X	1
11	X	X	1	X
10	1	0	1	1

    (a) $A + \overline{B}C$ (b) $B + \overline{C}D + BC$ (c) $A + \overline{B}\,\overline{D}$ (d) None of these

33. Which of the following uses empirically derived formulas to predict effort as a function of LOC or FP?
    (a) FP-Based Estimation
    (b) Process-Based Estimation
    (c) COCOMO
    (d) Both FP-Based Estimation and COCOMO

34. What will be the output of multiplexer shown below -
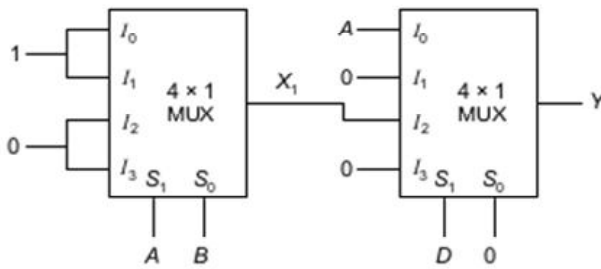
    (a) $A \oplus B$
    (b) $A \ominus D \ominus B$
    (c) $A + D + \bar{B}$
    (d) $A \cdot D$

35. What is the smallest size of Maximal Independent Set (MIS) of a chain of 9 nodes?
    (a) 9
    (b) 5
    (c) 3
    (d) 2

36. Consider fthe starting and ending time of activities A, B, C, D, E, F, G and H respectively in chronological order:
    $a_s \, b_s \, c_s \, a_e \, d_s \, c_e \, f_s \, b_e \, d_s \, g_s \, e_s \, f_e \, h_s \, g_e \, h_e$
    Where x_s denotes the starting time and x_e denotes the ending time of activity x. We need to schedule the activities in a set of lecture halls available to us. What is the minimum number of lecture halls needed to schedule all the activities without conflicts?
    (a) 3
    (b) 4
    (c) 5
    (d) 6

37. Let us consider the two strings
    X = BABCCD
    Y = ABACBCAD
    If ℓ is the length of longest common sub-sequence for X and Y and n is the number of such longest common sub-sequence for X and Y, Then what is the value of $\ell + 10n = ?$
    (a) 53
    (b) 54
    (c) 35
    (d) 45

38. Let W(n) and A(n) denote the worst case and average case execution time of an algortihm for the input size n. Which of the following is always true?
    (a) $A(n) = \Omega(W(n))$
    (b) $A(n) = \Theta(W(n))$
    (c) $A(n) = o(W(n))$
    (d) $A(n) = O(W(n))$

39. How many different max heap are possible using 10 distinct data items?
    (a) 2360
    (b) 1360
    (c) 3360
    (d) 3460

40. Consider a file which contains the following characters with given frequencies a:37, b:18, c:29, e:30, f:17, g: 6. What is the total number of bits are used to encode using Huffman Coding?
    (a) 450 bits
    (b) 402 bits
    (c) 550 bits
    (d) 350 bits

41. Let us consider the following
    A = Number of stackable permutation using 5 distinct numbers using stack.
    B = Number of ways to multiply the five matrices in Matrix chain multiplication
    What is the value of A – B = ?
    (a) 0
    (b) 28
    (c) 42
    (d) 14

42. Number of swapping operations done in bubble sort algorithm for the following input data items to be sorted in ascending order using bubble sort?
    50, 45, 37, 30, 26, 21, 16, 15, 10, 3
    (a) 23
    (b) 45
    (c) 55
    (d) 51

43. Let T is a full binary tree having 2011 nodes. How many internal nodes does T have?
    (a) 1004
    (b) 1005
    (c) 1006
    (d) 1007

44. Let us consider a simple un-directed weighted graph G with distinct edge weights $w \geq 10$ and 50 vertices. The MST T of G has cost 1245. If the cost of each edge is decreased by 5 and new graph is G' then what is the cost of MST of G'?
   (a) 1200   (b) 1245   (c) 1045   (d) 1000

45. What is normally considered as an adjunct to the coding step
   (a) Integration testing   (b) Unit testing
   (c) Completion of Testing   (d) Regression Testing

46. Let H be a heap of size more than 1000 stroring unique integer keys. Which of the following statements is false?
   (a) The second smallest key element must be at level 1.
   (b) The third smallest key element must be at level 2.
   (c) The forth smallest key element could be at level 2.
   (d) The fifth smallest key element could be at level 3.

47. Suppose M randomly selected keys are hashed into the range $[0........N–1]$ using a uniformly distributed hashing fucntion. Assume that $M \leq N$. What is the probability that all M keys yield distinct hash values (so no collisions occur)?

   (a) $\dfrac{(N-1)!}{(N-M)!* N^{M-1}}$ (b) $\dfrac{N!}{(N-M)!* N^{M-1}}$ (c) $\dfrac{N-1}{(N-M)!* N^{M}}$ (d) $\dfrac{N-2}{(N-M)!* N^{M-1}}$

48. If problem A is reducible to problem B in polynomial time then Which of the following is false?
   (a) if $B \in P$ then $A \in P$
   (b) if $A \in NPC$ then $B \in NP$ Hard
   (c) if B does not belongs to NP Hard then A does not belongs to NPC
   (d) if A does not belongs to P then B does not belongs to P

49. When does one decides to re-engineer a product?
   (a) when tools to support restructuring are disabled
   (b) when system crashes frequently
   (c) when hardware or software support becomes obsolete
   (d) subsystems of a larger system require few maintenance

50. Which of the following language is regular?
   (a) $\{UWW^{R} \mid U, W \in \{a, b\}^{+}\}$ (b) $\{WW^{R} \mid W \in \{a, b\}^{+}\}$
   (c) $\{WUW^{R} \mid U, W \in \{a, b\}^{+}\}$ (d) $\{WW^{R}U \mid U, W \in \{a, b\}^{+}\}$

51. Let us consider the following languages

   $L_1 = \{a^n b^n \mid n > 0\}$; $L_2 = \{b^n \mid > 0\}$

   What is the value of L_1/L_2?
   (a) $\{a^n b^n \mid n > 0\}$ (b) $\{a^n b^n \mid n \geq 0\}$ (c) $\{a^n b^m \mid n \geq m \geq 0\}$ (d) $\{a^n b^m \mid n \geq m\}$

52. Which of the following statement is false?
   (a) NPDA is more powerful than DPDA.
   (b) Every CFG in CNF in convertible into its equivalent GNF form.
   (c) All regular languages are not inherently ambiguous
   (d) If a grammar is LL(K + 1) then it must be LL(K)

53. Consider a CFG G in CNF. How many nodes there in the derivation tree for a string having length 15.
   (a) 44   (b) 29   (c) 33   (d) 55

54. Consider the following production rule

   $S \rightarrow T*P$; $T \rightarrow U \mid T * U$; $P \rightarrow Q + P \mid Q$

   $Q \rightarrow a$

   $U \rightarrow a$

Which of the following statement is FALSE?
(a) * is Left Associative
(b) + is right associative
(c) * has higher precedence than +
(d) + has higher preecedence than*

55. Consider the following code segement

$f = a + b$

$g = f * c$

$f = a - e$

$i = g + f$

What is the minimum number of temprory variable is used to convert above code in SSA form?
(a) 8
(b) 7
(c) 9
(d) 5

56. Which of the following statement is true?
(a) There exists a LL(k) grammar which is LL(K+1)
(b) There exists an LALR (1) grammar which is not LL(1)
(c) Operator grammar does allow NULL production
(d) If LR (1) Parse table does not have RR conflict then LALR(1) parse table never contain multiple entries

57. Consider a Binary code and block length n = 4. The number of codes at a radius of 2 is ?
(a) 9
(b) 10
(c) 11
(d) 16

58. Consider the following bit stream
S = 1111111111111110000000000000000001111
find the compression ratio after applying the Run Length Encoding.

(a) $\dfrac{9}{19}$
(b) $\dfrac{1}{18}$
(c) $\dfrac{9}{17}$
(d) $\dfrac{9}{20}$

59. Which of the following statement is FALSE?
(a) The prefix code is the code in which no code-word is prefix of any other codewrod.
(b) Wavelength Transform preserve the Multi-resolution property
(c) Chain codes are used to detect the boundary of an image
(d) Lossless channel has a channel capacity equal to the destination entropy when it is maximum.

60. Let a DMS with an alphabet X have entropy H(X) and produces symbols every T_s seconds. Let a discrete memory-less channel have a capacity of C and can be used once every T_c seconds. What is the condition which ensures that output can be transmitted over the noisy channel and be reconstructured easily?

(a) $\dfrac{H(X)}{T_s} \ge \dfrac{C}{T_c}$
(b) $\dfrac{H(X)}{T_s} \le \dfrac{C}{T_c}$
(c) $\dfrac{H(X)}{T_s} > \dfrac{C}{T_c}$
(d) $\dfrac{H(X)}{T_s} < \dfrac{C}{T_c}$

61. For a LBC (7, 4) the parity bits are defined as

$b_0 = m_0 \oplus m_1 \oplus m_2$; $b_1 = m_0 \oplus m_2 \oplus m_3$; $b_2 = m_1 \oplus m_2 \oplus m_3$

What is the codeword for the message 1110 by above code?
(a) 1110011
(b) 1110100
(c) 1110101
(d) 1110010

62. The source generates 160 symbols, 128 of which has a probability $\dfrac{1}{256}$ each and rest of the symbols has probability $\dfrac{1}{64}$ each. Find the Rate of information of source if it emits 10000 *sym/sec*

(a) 7000 *bits/symbols*
(b) 17000 *bits/symbols*
(c) 8000 *bits/symbols*
(d) 70000 *bits/symbols*

63. What are the pixel position to be glown if a line is drawn from P(10, 5) to Q(15, 9) using breshanham algorithm.
    (a) (10,5),(12,6), (12,8),(13,7),(14, 8), (15,9)
    (b) (10,5),(11,6), (12,7),(13,7),(14, 8), (15,9)
    (c) (10,5),(11,6), (12,8),(13,7),(14, 8), (15,9)
    (d) (10,5),(11,6), (12,7),(12,8),(14, 8), (15,9)

64. In a 512×512 raster on monochrome display with an average rate of 200 nanoseconds per pixel. What is refresh rate ?
    (a) 15 fps (b) 16 fps (c) 18 fps (d) 19 fps

65. Find the equation of straight line $y' = mx' + c$ in xy coordiantes if $x'y'$ coordinate system results from a 90° rotation of the xy coordinate system.
    (a) $x + my + c = 0$ (b) $x - my + c = 0$ (c) $x + my - c = 0$ (d) $x - my - c = 0$

66. Which of the following statement is false ?
    (a) The farther an object is from COP, the smaller it appear is the perspective foreshortening.
    (b) Objects behinds the COP are projected upside down and backward on the POP is known as view *confusion*.
    (c) A finite line segment joining a point lies in front of viewer to a point in back of the viewer is projected as broken line of an extent is called topological distortion.
    (d) None of the above

67. If $f(x)$, $g(x)$ and $h(x)$ are all admissible heuristics then which of the following is also guarranteed to be admissible heuristics?
    (i) $f(x) + g(x) + h(x)$ (ii) $f(x) * g(x) * h(x)$
    (iii) Max $(f(x), g(x), h(x)$ (iv) Min $(f(x), g(x), h(x))$
    (v) $\dfrac{f(x) + g(x) + h(x)}{3}$
    (a) i, ii, iii only   (b) iii, iv and v   (c) i, ii, v only   (d) i, ii, iii, iv, v

68. Assuming that one allows 2^{24} depth values to be used, How much memory would a 1024×768 pixel display require to store Z-Buffer?
    (a) 2300 KB   (b) 41800 KB   (c) 2304 KB   (d) 2400 KB

69. If two bits are 0's and two bits are 1's in a code of a sub-region in Cohen Sutherland Line clipping algorithm. Then the sub-region is ?
    (a) Corner region   (b) Middle region   (c) Central region   (d) Either (B) or (C)

70. Consider the following prolog program
    p(1).
    p(2):-!.
    p(3).
    How many answer the following query produce?
    ?-p(X),!,p(Y).
    (a) 2   (b) 3   (c) 4   (d) 6

71. Which of the following search methods has the space complexity (worst case)?
    (a) A*   (b) BFS   (c) DFS   (d) Bidirectional Search

72. In a general CSP with n variables, each taking d possible values, what is the maximum number of times a backtracking search algorithm might have to backtrack (i.e. the number of the times it generates an assignment, partial or complete, the violates the constraints) before finding a solution or concluding that none exists?
    (a) $O(n^2 d^3)$ (b) $O(nd^2)$ (c) $O(n^d)$ (d) $O(d^n)$

73. What is the re-solvent of C = $\{\neg A \vee B, \neg B \vee C, \neg C \vee D, \neg D \vee E\}$
    (a) $\neg A \vee E$ (b) $A \vee \neg E$ (c) $\neg A \vee \neg E$ (d) $A \vee D$

74. In an 8085 microprocessor, the following program is executed

Address location	Instruction
2000H	XRA A
2001H	MVI B, 04H
2003H	MVI A, 03H
2005H	RAR
2006H	DCR B
2007H	JNZ 2005
200AH	HLT

At the end of program register A contains
(a) 60H   (b) 30H   (c) 06H   (d) 03H

75. In an 8085 microprocessor, the shift registers which store the result of an addition and the overflow bit are, respectively.
(a) B and F   (b) A and F   (c) H and F   (d) A and C

76. When does a neural network model become a deep learning model?
(a) When you add more hidden layers and increase depth of neural network
(b) When there is higher dimensionality of data
(c) When the problem is an image recognition problem
(d) None of these

77. Three main basic features involved in characterizing membership function are
(a) Intution, Inference, Rank Ordering   (b) Fuzzy Algorithm, Neural network, Genetic Algorithm
(c) Core, Support , Boundary   (d) Weighted Average, center of Sums, Median

78. A network is created when we multiple neurons stack together. Let us take an example of a neural network simulating an XNOR function.
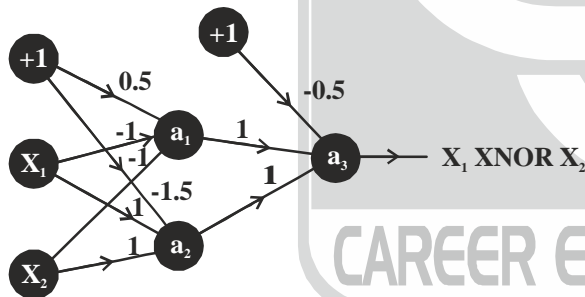
You can see that the last neuron takes input from two neurons before it. The activation function for all the neurons is given by:

$$f(x) = \begin{cases} 0, & for\ x < 0 \\ 1, & for\ x \ge 0 \end{cases}$$

Suppose X_1 is 0 and X_2 is 1, what will be the output for the above neural network?
(I) 0   (II) 1
(a) Only I   (b) Only II   (c) both of them   (d) none of these

79. In WLAN products, there are two methods used with spread spectrum transmission. Which of the following statement(s) concerning direct sequence modulation is/are correct?
1. With this method the transmitter and receiver units need to be aligned.
2. A unique code is transmitted with each signal.
3. The signal power should be considerably high, and therefore no code is needed with the transmitted signal.
4. Signals are transmitted on a frequency band known as the ISM band.
(a) 1,3   (b) 2,4   (c) 1,4   (d) None

80. According to the IEEE Project 802.11, there are two types of wireless LAN. In an infrastructured-based network, what is a BSA (Basic Service Area)?
    1. A BSA is a wireless station.
    2. A BSA is a gateway which connects a wireless station to a network.
    3. A BSA is simply a cell.
    4. A BSA is another word for server.
    (a) 1 Only   (b) 2,4   (c) 3 Only   (d) None

81. What is a mobile intelligent agent?
    1. A mobile agent is needed for a computer to communicate with another computer over a network
    2. A mobile intelligent agent is an intelligent program that contains the client's requests, messages and references.
    3. A mobile intelligent agent is an intelligent robot used for communication.
    (a) 1,3   (b) 2 Only   (c) 2,3   (d) None

82. A system has 9 process sharing 10 resources if each process needs a maximum of 2 units then dead lock
    (a) can never occur   (b) may be occur   (c) has to occur   (d) none of these

83. What is the correct matching of the following pairs ?
    A. Disk scheduling   1. FIFO
    B. Batch processing   2. SCAN
    C. Time sharing   3. Round Robin
    D. Interrupt processing   4. LIFO
    Codes :
    (a) A-2, B-1, C-3, D-4   (b) A-1, B-2, C-3, D-4
    (c) A-2, B-1, C-4, D-3   (d) A-1, B-2, C-4, D-3

84. If a process are present in the system how many ways are possible to schedule them ?
    (a) n^3 (b) $n!$ (c) n^2 (d) $4n$

85. Which of the following operation is performed by swap space ?
    (a) Saving process data   (b) Saving drivers
    (c) Swapping data   (d) Storing HTML pages

86. In a paged segmented scheme of memory management, the segment table itself must have a page table because
    (a) the segment table is often too large to fit into one page.
    (b) each segment is spread over a number of pages.
    (c) segment tables point to page tables and not to the physical location of the segment.
    (d) None of the above.

87. Which of the following statement is NOT TRUE ?
    (a) Deadlock can be shared if all resources can be shared by competing processes.
    (b) Deadlock can never occur if resources must be requested is the increasing order by person.
    (c) Deadlock can never occur if processes must request in advance all their resources that they will require.
    (d) If the resource allocation graph deplicts a cycle, then deadlock has certainty occured.

88. Which of the following process scheduling algorithm may lead to starvation ?
    (a) FIFO   (b) Round Robin   (c) Shortest job first   (d) None of these

89. If the time quantum of Round Robin algorithm is given very large then it becomes equivalent to which of the following algorithm ?
    (a) Shortest Remaining Time First (SRTF)   (b) Longest Remaining Time First (LRTF)
    (c) Priority scheduling   (d) First-come-first-serve

90. The maximum number of superkeys for a relation schema R(A, B, C, D, E) with E as the key is
    (a) 8   (b) 16   (c) 32   (d) 4

91. Which commands are use to control access over objects in relational database.
    (a) CASCADE & MVD
    (b) GRANT & REVOK
    (c) QUE & QUIST
    (d) QUEST

92. A view of a database that appears to an application program is known as
    (a) schema
    (b) subschema
    (c) virtual table
    (d) none of these

93. Consider the relation scheme R = (E, F, G, H, I, J, K, L, M, N) and the set of functional dependencies {{E, F} → {G}, {F} → {I, J}, {E, H} → {K, L}, {K} → {M}, {L} → {N}} on R. What is the key of R ?
    (a) {E, F}
    (b) {E, F, H}
    (c) {E, F, H, K, L}
    (d) {E}

94. Which of the following combination represents a valid data model ?
    (a) Object based data model, table data model.
    (b) Relational data model, hierarchical data model SQL data model.
    (c) Relational data model, E-R model, normal form data model, network data model.
    (d) E-R model, relational data base model, object based data model.

95. In the context of relational algebra, which of the following are unary operation.
    I. SELECT   II. PROJECT   III. UNION   IV. PRODUCT
    (a) All are binary operations
    (b) I and II only
    (c) II only
    (d) I and III only

96. Which statement is CORRECT ?
    (a) All relation in 2NF is there not in BCNF.
    (b) In 2NF attribute B is not functionally dependent on attribute A.
    (c) All relation in BCNF is there in 3NF.
    (d) There exist no relations no relation in BCNF and 3NF.

97. Suppose X is a component of some tuple and the domain for that component of some tuple, and the domain for that component is the integer. If X has the NULL, what is the value of
    I. 0 * X
    II. X – X
    (a) NULL, NULL
    (b) 0, 0
    (c) NULL, 0
    (d) 0, NULL

98. Which of the following is not a phase of "bath tub curve" of hardware reliability?
    (a) Useful Life
    (b) Burn-in
    (c) Wear-out
    (d) Time

99. Let $X = \{a, b, c, d\}$ and A fuzzy set $A = \left\{ \dfrac{\cdot 2}{a}, \dfrac{\cdot 4}{b}, \dfrac{1}{c}, \dfrac{\cdot 7}{d} \right\}$ then what will the value of $A^c\left(\bar{A}\right)$

    (a) $A^c = \left\{ \dfrac{\cdot 8}{a}, \dfrac{\cdot 6}{b}, \dfrac{0}{c}, \dfrac{\cdot 2}{d} \right\}$

    (b) $A^c = \left\{ \dfrac{\cdot 8}{a}, \dfrac{\cdot 6}{b}, \dfrac{0}{c}, \dfrac{\cdot 3}{d} \right\}$

    (c) $A^c = \left\{ \dfrac{\cdot 7}{a}, \dfrac{1}{b}, \dfrac{\cdot 4}{c}, \dfrac{\cdot 2}{d} \right\}$

    (d) $A^c = \left\{ \dfrac{\cdot 2}{a}, \dfrac{\cdot 4}{b}, \dfrac{1}{c}, \dfrac{\cdot 7}{d} \right\}$

100. The containment of two fuzzy relation R and T is given by _____
    (a) $R \subset T \Rightarrow \mu_R(x, y) \le \mu_T(x, y)$
    (b) $R \subset T \Rightarrow \mu_R(x, y) \le \mu_R(x, y)$
    (c) $R \subset T \Rightarrow \mu_R(x, x) \ge \mu_T(y, y)$
    (d) None

Space for rough work

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ANSWER KEY

PAPER – I

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

PAPER – II

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