Test Booklet No. [   ]

Ph.D. Entrance Examination, July, 2023
Subject : COMPUTER SCIENCE AND ENGINEERING

Name of Candidate .... Answer Sheet No. ....

Roll No. of the Candidate .... Signature of the Candidate: ....

Date of Examination: .... Signature of the Invigilator(s)

1. ....

2. ....

Time : 2 Hours]   [Maximum Marks : 100

IMPORTANT INSTRUCTIONS

(i) The question paper is in the form of Test-Booklet containing **100 (Hundred)** questions. Each question carries four answers marked (A), (B), (C) and (D), out of which only one is correct.

(ii) On receipt of the Test-Booklet (Question Paper), the candidate should immediately check it and ensure that it contains all the pages, i.e., **100** questions (50 in Part–A + 50 in Part–B). Discrepancy, if any, should be reported by the candidate to the invigilator immediately after receiving the Test-Booklet.

(iii) A separate Answer-Sheet is provided with the Test-Booklet/Question Paper. On this sheet there are **100** rows (50 in Part–A + 50 in Part–B) containing four circles each. One row pertains to one question.

(iv) The candidate should write his/her roll number at the places provided on the cover page of the Test-Booklet/Question Paper and on the Answer-Sheet and NOWHERE ELSE.

(v) No second Test-Booklet/Question Paper and Answer-Sheet will be given to a candidate. The candidates are advised to be careful in handling it and writing the answer on the Answer-Sheet.

(vi) For every correct answer of the question **One (1) mark will be awarded.** For every unattempted question, Zero (0) mark shall be awarded. **There is no Negative Marking.**

(vii) Marking shall be done only on the basis of answers responded on the Answer-Sheet.

(viii) To mark the answer on the Answer-Sheet, candidate should **darken** the appropriate circle in the row of each question with Blue or Black pen.

(ix) For each question only **one** circle should be **darkened** as a mark of the answer adopted by the candidate. If more than one circle for the question are found darkened or with one black circle any other circle carries any mark, the question will be treated as cancelled.

(x) The candidates should not remove any paper from the Test-Booklet/Question Paper. Attempting to remove any paper shall be liable to be punished for use of unfair means.

(xi) Rough work may be done on the blank space provided in the Test-Booklet/Question Paper only.

(xii) *Mobile phones (even in Switch-off mode) and such other communication/programmable devices are not allowed inside the examination hall.*

(xiii) No candidate shall be permitted to leave the examination hall before the expiry of the time.

DO NOT OPEN THIS QUESTION BOOKLET UNTIL ASKED TO DO SO.

1. Which of the following does not characterise the diagnostic evaluation in teaching system?

(A) A type of pre-evaluation in which teacher assesses learner's strengths and weaknesses prior to beginning of teaching process.

(B) It is useful in developing curriculum plan based on learner's capabilities.

(C) This kind of evaluation is used to estimate and anticipate a pupil's career.

(D) It is the process of determining the root cause of a pupil's problem

2. If "X & Y" means X is husband of Y; "X % Y means X is father of Y; "X @ Y is mother of Y; then how is A related to M when A % C & F @ L & M?

(A) Father-in-law

(B) Grand father-in-law

(C) Grand father

(D) Grand mother-in-law

3. During COVID-19 most classes had moved to online and teachers used interactive slides and presentations to explain concepts. This exemplifies the use of ...

(A) Visual aids

(B) Audio aids

(C) Audio-visual aids

(D) All the three

4. Select the number from the given options that can replace the question mark (?) in the following series.

4, 10, 28, ?, 244, 730

(A) 82

(B) 84

(C) 86

(D) 80

5. Select the letter from the given options that can replace the question mark (?) in the following series.

I, M, P, T, ?, A

(A) Y

(B) W

(C) V

(D) X

6. Which of the following is/are the barrier/s in effective communication?

1. Unfamiliar accents

2. Prejudices

3. Fear or stress

4. Lack of relevance

Options:

(A) 2 and 3

(B) 1, 2, and 3

(C) 1, 3, and 4

(D) 1, 2, 3, and 4

7. .... research strategy is employed for establishing cause-and-effect relationships that allow generalizations to be extended to similar situations.

   (A) Exploratory

   (B) Explanatory

   (C) Applied

   (D) Descriptive

8. If in a coding system DAYCARE is coded as 54 and JOURNEY is coded as 105, then how will FURTHER be coded in the same coding system?

   (A) 99

   (B) 98

   (C) 96

   (D) 93

9. Three of the following four letter-clusters are alike in a certain way and one is different. Pick the odd one.

   (A) EILP

   (B) LPSW

   (C) ORVY

   (D) CGJN

10. Which of the following statements is true in respect of hypothesis testing?

    1. Null hypothesis is tested in two-tailed format.

    2. Alternate hypothesis is tested in two-tailed format.

    3. Null hypothesis is tested in one-tailed format.

    4. Alternate hypothesis is tested in one-tailed format.

    Options:

    (A) 1 only

    (B) 2 only

    (C) 2 and 3 only

    (D) 1 and 4 only

11. "Discussion" chapter of the thesis deals with ....

    (A) Connecting the findings back to the research questions, purpose statement, hypotheses, and earlier researches.

    (B) Presenting the collected data in a clear, organized, and factual manner with evidence of hypothesis testing.

    (C) Statistical analysis and organisation of data, drawing inference and interpretation.

    (D) Analyzing the results, checking their significance, and presenting the description with figures.

12. Three statements are given followed by three conclusions numbered I, II, and III. Assuming the statements to be true, even if they seem to be at variance with commonly known facts, decide which of the conclusions logically follow(s) from the statements?

    Statements:

    1. All Sparrows are Birds.

    2. All Birds are Eagles.

    3. Some Birds are Black.

    Conclusions:

    I. Some Black things are Sparrows.

    II. Some Eagles are not Sparrows.

    III. No Black thing is a Sparrow.

    Options:

    (A) Only conclusion I follows.

    (B) Only conclusion II follows.

    (C) Only conclusion III follows.

    (D) Either conclusion I or III follows.

13. An agriculture scientist is interested in examining the crop quality of two distinct varieties of wheat seeds (J and K). He decides to sow seed J and K in two plots already prepared and earmarked by each of the fifty-four farmers in a radius of ten kilometers.Irrigation, fertilizer, weeding etc. were almost uniform/controlled across the plots and farms. He is most probably utilizing .... research.

    (A) Experimental

    (B) Quasi-experimental

    (C) Ex-post facto

    (D) None of these

14. Which of the following sources of data collection usually suffers from a cognitive bias called Halo effect?

    (A) Questionnaire

    (B) Online survey

    (C) Interview

    (D) Laboratory experiment

15. The present examination system ....

    1. Does not promote good study habits.

    2. Promotes rote learning.

    3. Is not a good test of one's academic attainment.

    4. Does not encourage students to be regular in the class.

    Options:

    (A) 1 and 2 only

    (B) 1, 2, and 4 only

    (C) 2, 3, and 4 only

    (D) 1, 2, 3, and 4

16. Analysis procedure for qualitative data which is largely descriptive and which details the way of life of particular individuals, groups or organizations is called ....

    (A) Analytic induction

    (B) Life histories

    (C) Ethnographic accounts

    (D) Narrative analysis

17. Which of the learner's characteristics determines how the learner perceives, remembers, thinks, and organizes the information?
    (A) Personal
    (B) Cognitive
    (C) Academic
    (D) All the three

18. Which of the following statements is truthful?
    1. Any toxic chemicals present in the soil will get absorbed by the plants, these get passed up through the food chain.
    2. Compared to the other types of pollution, the effects of soil pollution are more obscure, but their implications are well noticeable.
    Options:
    (A) Both 1 and 2
    (B) None of these
    (C) 1 is true, 2 is untrue
    (D) 1 is untrue, 2 is true

19. Select the word-pair in which the words are related in the same way as are the words in the following pair.
    English : Latin
    (A) Telugu : Malayalam
    (B) Gurmukhi : Punjabi
    (C) Sanskrit : Devanagari
    (D) Urdu : Pashto

20. Which of the following does not pertain to quantitative data?
    (A) Content analysis
    (B) Reliability analysis
    (C) Linear model
    (D) Data mining

21. The communication becomes circular when:
    (A) the same message moves top to bottom and bottom to top.
    (B) each person is both a sender and a receiver.
    (C) two different persons receive the same message.
    (D) the message is sent again and again

22. Observe the statement I and II given below and choose your answer from the given options.
    I. Earthquakes of significant magnitude take place in certain zones of India.
    II. The Indian plate thrusts underneath the Eurasian plate at a speed of 5 cm per year, which keeps accumulating in the rocks.
    Options:
    (A) Statement I and II are the consequences of some unknown factors.
    (B) Statement I and II are unrelated to each other.
    (C) Statement II is the consequence and Statement I is its cause.
    (D) Statement I is the consequence and Statement II is its cause.

23. The dust and soot released from the industrial chimneys that suspends in the air is a kind of ....
    (A) Particulate pollutants
    (B) Fly ash
    (C) Lead & other metals
    (D) Gaseous pollutants

24. What was the budget allocation to education for the financial year 2023-24?
    (A) Rs. 1.32 lakh crore
    (B) Rs. 1.40 lakh crore
    (C) Rs. 1.12 lakh crore
    (D) Rs. 1.50 lakh crore

25. When a chosen symbol, word, or gesture conveys multiple meanings, it is characterized as:
    (A) Sender barrier
    (B) Personal barrier
    (C) Technical barrier
    (D) Semantic barrier

26. Asking "Do you understand" on the part of a teacher contributes to .... classroom communication.
    (A) effectiveness of
    (B) confusion in
    (C) blurring of real message in
    (D) personal bias in

27. Select the characteristics of good teaching amongst the following:
    1. Can easily impress the students.
    2. Commitment to encourage independence and motivation.
    3. Giving fair and objective feedback on students' performance.
    4. Ability to improvise and adapt to new demands.
    Options:
    (A) 2 and 3only
    (B) 1, 3, and 4 only
    (C) 2, 3, and 4 only
    (D) All the four

28. A researcher has got grouped frequencies across different range of scale values of a variable. Which type of graph can best represent the observed trend of results?
    (A) Scatter plot
    (B) Histogram
    (C) Pie graph
    (D) Line graph

29. A .... is an organized gathering in which various professionals present and discuss their research work or deliberate on their area of expertise.
    (A) Conference
    (B) Seminar
    (C) Symposium
    (D) Workshop

30. Which among the following are essential defining attributes of ICT?

1. Relevant information may be converted into or delivered through digital forms.
2. Can be deployed for enhancing access to and reach of resources, as well as management of educational system.
3. Includes interactive digital content, internet, and other satellite communication devices.
4. Can be used as a major vehicle for all round socioeconomic development of the country.

Options:

(A) 2 and 3 only

(B) 1 and 2 only

(C) 1, 2, and 3 only

(D) 1, 2, 3, and 4

31. The Kothari commission report was focused on:

(A) Earn while learn scheme.

(B) Diversification of education.

(C) Education and national development.

(D) Promotion of basic education rural areas.

32. Which of the following does not characterize communication?

(A) Message sent is the message received.

(B) Encompasses sharing and distributive justice.

(C) Communication maintains and animates life.

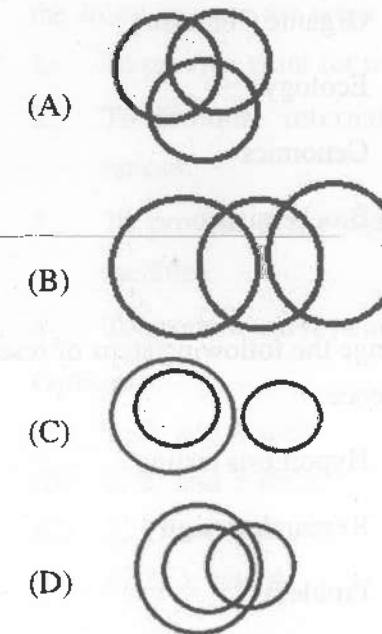(D) It is a social interaction through messages.

33. The increase in temperature in aquatic system has profound effect on organisms as well as on water quality. Which of the following are its consequences?

1. Bacteriamultiply rapidly.
2. Decrease in biological oxygen demand.
3. Reduction in dissolved oxygen.
4. Leads to direct fish mortality.

Options:

(A) 1 and 3 only

(B) 3 and 4 only

(C) 1, 3, and 4 only

(D) All the four

34. Select the Venn diagram that best illustrates the relationship between the following classes: Men, Boxers, students

(A)

(B)

(C)

(D)

35. Which of the following is/are surely the disadvantages of ICT?

1. Potential risk of getting addicted to electronic and social media.
2. Extended use of ICT devices leads to serious health hazards.
3. Periodicals available on internet are very costly propositions.
4. Computer and automated devices are leading cause of unemployment.

Options:

(A) 2 and 4 only

(B) 1, 3 and 4 only

(C) 2, 3, and 4 only

(D) 1, 2, and 4 only

36. Identify the correct sequence of the following in the communication process.

(A) Encoding → Message → Receiver → Decoding → Channel

(B) Message → Encoding → Channel → Receiver → Decoding

(C) Encoding → Channel → Message → Receiver → Decoding

(D) Encoding → Channel → Receiver → Message → Decoding

37. The University that telecasts its own interactive educational programs is ....

(A) IG National Open University

(B) Dr. B.R. Ambedkar Open University

(C) University of Pune

(D) Annamalai University

38. Should third gender persons be encouraged to get admission in educational institution at par with common people.

Arguments:

I. Yes, it is their fundamental right, right to equality.

II. No, it will impair the congenial atmosphere in education institutions.

Options:

(A) Both the arguments are forceful.

(B) Either argument I or II is forceful.

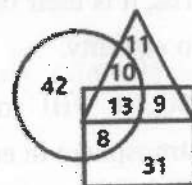(C) Neither argument I nor II is forceful.

(D) Only argument I is forceful.

39. What is the full form of computer terminology ADSL?

(A) Additional data subscription link.

(B) Asymmetric digital subscriber line.

(C) Advanced digital system line.

(D) Access demand subscriber link.

40. Distance education was firstly launched in ....

(A) School of Correspondence Courses and Continuing Education, University of Delhi.

(B) Dr. B.R. Ambedkar Open University.

(C) Indira Gandhi National Open University.

(D) Directorate of Distance Education, Annamalai University.

41. If triangle represents motorists, circle represents horse riders, and rectangle represents foot ballers, then what's the number of motorists who are foot ballers but not horse riders.

(A) 8

(B) 13

(C) 9

(D) 10

42. Three of the following four terms are alike in a certain way and one is different. Pick the number that is different from the rest.

(A) Organic Chemistry

(B) Ecology

(C) Genomics

(D) Biochemistry

43. Arrange the following steps of research in a sequence:

1. Hypothesis testing

2. Research design

3. Problem

4. Data collection

Options:

(A) $2 \rightarrow 1 \rightarrow 3 \rightarrow 4$

(B) $3 \rightarrow 2 \rightarrow 4 \rightarrow 1$

(C) $3 \rightarrow 2 \rightarrow 1 \rightarrow 4$

(D) $2 \rightarrow 3 \rightarrow 1 \rightarrow 4$

44. For most of the parametric statistical analyses the data must qualify ....

(A) at least interval level measurement

(B) at least ordinal level measurement

(C) at least ratio level measurement

(D) A or B

45. The Indian Council of Social Science Research is committed to promote research in social science in the country. Which of the following are the areas at its focus?

1. To provide grant for research projects.

2. To promote international collaborations.

3. To provide grant-in-aid for teaching facilities.

4. To promote surveys and publications.

Options:

(A) 1, 2, and 4 only

(B) 1, 2, and 3 only

(C) 2, 3, and 4 only

(D) 1, 2, 3, and 4

Direction (Q. Nos. 46-50) : Read the following passage and answer the question Nos. 46 to 50:

Plenty of vaccines were developed for controlling Coronavirus Disease 2019 (COVID-19) responsible for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) pandemic. A study compared the efficacy of these vaccines in preventing symptomatic and severe disease in the adult population and to prevent symptomatic COVID-19 among the elderly. Leading medical databases were searched until August 30, 2021. Only published phase 3 randomized controlled trials (RCTs) evaluated efficacy of the vaccine to prevent symptomatic and sever COVID-19 in adults were included. Two reviewers independently evaluated the literature search results and independently extracted summary data and the risk of bias was evaluated using the Cochrane RBA Tool. The primary outcomes were the efficacy of the vaccine against symptomatic COVID-19 in adults. A total of 200,000 adult participants from eight phase-3 RCTs were included in NMA, of whom 52% received the intervention (active COVID-19 vaccine). While each of nine vaccines was tested in the unique clinical trial as compared to control, based on indirect comparison, BNT162b2 and mRNA-1273 vaccines were ranked with the highest probability of efficacy against symptomatic COVID-19 (P-scores 0.952 and 0.843, respectively), followed by Gam-COVID-Vac (P-score 0.782), NVX-CoV23730 (P-score 0.700), CoronaVac (P-score 0.570), BN02 (P-score 0.428), WIV04 (P-score 0.327), and Ad26.COV2.S (P-score 0.198). No statistically significant difference was seen in the ability of the vaccines to prevent symptomatic disease in the elderly population. No vaccine was statistically significantly associated with a decreased risk for severe COVID-19 than other vaccines, although mRNA-1273 and Gam-COVID-Vac have the highest P-scores (0.899 and 0.816, respectively), indicating greater protection against severe disease than other vaccines.

46. According to the study fourth most effective vaccine against symptomatic COVID-19 was

(A) CoronaVac

(B) mRNA-1273

(C) NVX-CoV23730

(D) Gam-COVID-Vac

47. Which of the following statements is surely incorrect?

 (A) In the case of elderly population all the vaccines were almost equally effective in preventing symptomatic disease.

 (B) The study presents evidence that BNT162b2 is the safest vaccine against symptomatic COVID-19.

 (C) Gam-COVID-Vac proved to be second most effective in protection against severe disease.

 (D) Findings of the study may be useful in choosing most effective vaccine for COVID-19.

48. Most probable reason behind independent evaluation of the literature search results by two reviewers is:

 1. Reducing subjectivity and bias
 2. Ensuring reliability of findings
 3. Meating ethical standard
 4. Improving validity of findings

 Options:
 (A) 1 only
 (B) 1 and 3
 (C) 2 and 4
 (D) 1, 2, and 4

49. The conclusion, "No vaccine was statistically significantly associated with a decreased risk for severe COVID-19 than other vaccines" implies:

 (A) There exists no difference in the efficacy of tried vaccines for severe COVID-19.

 (B) None of the vaccines was found effective in decreasing risk for severe COVID-19.

 (C) Results need to be statistically significant in order to arrive at meaningful inference.

 (D) Some of the vaccines might be statistically associated with a decreased risk for symptomatic COVID-19 than other vaccines.

50. How many of phase-3 adult participants did not receive vaccination dose?

 (A) 104000
 (B) 100400
 (C) 96000
 (D) Can not be ascertained

51. Consider a two dimensional array A[30][20]. Assume 4 words per memory cell, the base address of array A is 500, elements are stored in row-major order and first element is A[0][0]. What is the address of A[13][6]?

 (A) 1916
 (B) 1564
 (C) 1764
 (D) 1516

52. Consider an example of AVL tree where 131 is present at the root and 85 is in the left of 131, 129 is in the right of 85. (ii) Consider another example of an AVL tree where 876 is at the root and 971 is in the right of 876, 1001 is in the right of 971. Now after LR rotation in case (i) and RR rotation in case (ii), who will become the new root of AVL tree?

 (A) 129, 1001
 (B) 85, 971
 (C) 85, 1001
 (D) 129, 971

53. Identify the "queue full" condition in case of Double ended queue

 (A) If ((front=0 && rear=max −1) || (front = rear+1))
 (B) If (front=0 && rear=max −1)
 (C) If (front= −1 && rear = −1)
 (D) If (rear= max −1)

54. A paging virtual memory system has 32 bit virtual addresses, 24 bit physical addresses and 2 KB page size. How many page table entries are required for this system?

 (A) 232
 (B) 224
 (C) 221
 (D) None of the above

55. Given below are two statements:

 Statement-I : If the number of stages in the instruction pipeline increases then the degree of parallelism decreases due to the increased complexity of the pipeline.

 Statement-II: Hardwired control unit is rigid but faster as compared to multi-programmed control unit.

 In the light of the above statements, choose the most appropriate answer from the options given below:

 (A) Both Statement-I and Statement-II are correct

 (B) Both Statement-I and Statement-II are incorrect

 (C) Statement-I is correct and Statement-II is incorrect

 (D) Statement-I is incorrect and Statement-II is correct

56. Consider the following statements in respect to a vector computer:

(i) Set of vector instructions that could potentially begin execution in one clock cycle is called convoy

(ii) Chime is time unit to execute one vector instruction

(iii) Strip mining is used to split a large loop into loops less or equal to the maximum vector length

(iv) Vector mask register is used to hide control instructions

Choose the correct answer from the options given below:

(A) (i) and (iii) only

(B) (ii) and (iv) only

(C) (i) and (ii) only

(D) (iii) and (iv) only

57. Arrange the following addressing modes in a sequence from fastest to slowest.

(i) Direct

(ii) Register

(iii) Indirect

(iv) Implied

Choose the correct answer from the options given below:

(A) (iv), (ii), (i), (iii)

(B) (iii), (i), (iv), (ii)

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

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

58. The amount of light emitted by the phosphor coating depends on the _____?

(A) Number of electrons striking the screen

(B) Speed of electrons striking the screen

(C) Distance from the cathode to the screen

(D) None of the above

59. Given the relation R(A, B, C, D) and the set F = {AB →C B →D, D →B} find the candidate keys of the relation.

(A) AB & CD

(B) ABCD

(C) BD & AB

(D) AB & AD

60. For a database relation R (a, b, c, d) where the domains of a, b, c and d include only atomic values. The functional dependency a →c, b →d holds in the relation is _____.

(A) In 2NF not in 3NF

(B) In 1NF not in 2NF

(C) In BCNF

(D) In 3NF

61. In a room containing 28 females, there are 18 females who can speak English, 15 females speak French and 22 speak German. 9 females speak both English and French, 11 females speak both French and German whereas 13 speak both German and English. How many females speak all the three languages?

(A) 9

(B) 8

(C) 6

(D) 7

62. Find the minimum number n of integers to be selected from A = {1, 2, 3, ..., 9} so that (a) the sum of two of the n integers is even; (b) the difference of two of the n integers is 5.

(A) n = 4, 5

(B) n = 3, 4

(C) n = 3, 6

(D) n = 5, 4

63. Consider the following schema

Branch = (Branch-name, Assets, Branch-city)

Customer = (Customer-name, Bank-name, Customer-city)

Borrow = (Branch-name, loannumber, customer account-number)

Deposit = (Branch-name, Accountnumber, Customer-name, Balance)

Using relational Algebra, the Query that finds customers who have balance more than 10,000 is_____

(A) πcustomer-name (σbalance > 1000 (Deposit))

(B) σcustomer-name (σbalance > 1000 (Deposit))

(C) πcustomer-name (σbalance > 1000 (Borrow))

(D) σcustomer-name (σbalance > 1000 (Borrow))

64. Which of the following is an activity that distributes estimated effort across the planned project duration by allocating the effort to specific software engineering tasks?

(A) Software Macroscopic schedule

(B) Software Project scheduling

(C) Software Detailed schedule

(D) None of the mentioned

65. Suppose a system contains n processes and system uses the round robin algorithm for CPU scheduling then which data structure is best suited for ready queue of the process.

(A) Circular Queue

(B) Tree

(C) Stack

(D) Queue

66. In a simple paging system with 2^24 bytes of physical memory, 256 pages of logical address space and a page size of 2^10 bytes, how many bits are in logical address?

(A) 12

(B) 14

(C) 16

(D) 18

67. When multiple modules have read and write access to some global data, it is called:

(A) Content coupling

(B) Stamp coupling

(C) Data coupling

(D) Common coupling

68. Assume that a programme will experience 200 failures in finite time.it has now experienced 100 failures. The initial failure intensity was 20 failure/CPU hr. Then the current failure intensity is _____.

(A) 10 failures/CPU hr

(B) 18 failures/CPU hr

(C) 25 failures/CPU hr

(D) 28 failures/CPU hr

69. _____ is the process that removes defects before they can precipitate into serious hazards.

(A) Clean room software engineering

(B) Incremental model

(C) Agile model

(D) Spiral model

70. The determinant of the matrix whose Eigen values are 7, 1, 9 is given by _____.

(A) 7

(B) 9

(C) 63

(D) None of the above

71. Multiplication of real valued square matrices of same dimension is _____.

(A) Always positive definite

(B) Not always possible to commute

(C) Associative

(D) Commutative

72. $(x^2 + y^2)\, dy = xy\, dx$. If $y(x_0) = e$, $y(1) = 1$, then the value of $x_0 =$ _____.

(A) $\sqrt{3}e$

(B) $\pm \sqrt{3}e$

(C) $\pm \sqrt{2}e$

(D) None of the above

73. The differential equation of all parabolas whose axes are parallel to y-axis is _____.

(A) $d^3y / dx^3 = 1$

(B) $d^3y / dx^3 = 0$

(C) $d^3y / dx^3 = -1$

(D) None of the above

74. Which of the methods is a direct method for solving simultaneous algebraic equations?

(A) Relaxation method

(B) Gauss seidel method

(C) Jacobi's method

(D) Cramer's rule

75. Polar form of the Cauchy- Riemann equation is _____.

(A) $\partial u / \partial r = r\, \partial v / \partial \theta$ and
$\partial v / \partial r = -r\, \partial u / \partial \theta$

(B) $\partial u / \partial r = 1/r\, \partial v / \partial \theta$ and
$\partial v / \partial r = -1/r\, \partial u / \partial \theta$

(C) $\partial u / \partial r = 1/r\, \partial v / \partial \theta$ and
$\partial v / \partial r = -r\, \partial u / \partial \theta$

(D) $\partial u / \partial r = r\, \partial v / \partial \theta$ and
$\partial v / \partial r = -1/r\, \partial u / \partial \theta$

76. What is the probability of getting the sum as a prime number if two dice are thrown?

(A) 5/24

(B) 5/12

(C) 5/30

(D) 1/4

77. If $P(A) = 0.4$, $P(B) = 0.7$ and $P(B/A) = 0.6$. Find $P(A \cup B)$.

(A) 0.46

(B) 0.86

(C) 0.76

(D) 0.54

78. The geometric mean of series having mean = 25 and harmonic mean = 16 is:

(A) 16

(B) 18

(C) 20

(D) 25

79. According to the Cohen-Sutherland algorithm, where the line lies, if the 4-bit code of both ends is 0000, and also the logical OR gives 0000?

(A) Half outside half inside

(B) Completely inside

(C) Completely outside

(D) None of the above

80. Which of the following algorithm aims to overcome the difficulties of the seed fill algorithm?

(A) Scan line algorithm

(B) Boundary fill algorithm

(C) Flood fill algorithm

(D) Fill area algorithm

81. Which of the following is the correct syntax to display the hyperlinks without any underline?

(A) a {text-decoration : underline;}

(B) a {decoration : no-underline;}

(C) a {text-decoration : none;}

(D) None of the above

82. Choose the server-side JavaScript object?

(A) FileUpLoad

(B) Function

(C) File

(D) Date

83. Which of the following types of software maintenance, is most effort consuming?

(A) Adaptive maintenance

(B) Corrective maintenance

(C) Perfective maintenance

(D) Preventive maintenance

84. As per McCall's quality factor, the extent of effort required to learn, operate and understand the functions of the software is:

(A) Efficiency

(B) Integrity

(C) Usability

(D) Flexibility

85. The context free grammar generating {anb2n | n ≥ 1} is

(A) G = ({S}, {a, b}, P, S) where P consists of S → aSbb, S → abb

(B) G = ({S}, {a, b}, P, S) where P consists of S → aS, S → ab

(C) G = ({S}, {a, b}, P, S) where P consists of S → b, S → a

(D) G = ({S}, {a, b}, P, S) where P consists of S → b, S → a

86. Which of the following class of statement usually produce no executable code when complied?

(A) Declaration

(B) Assignment statements

(C) Input and output statements

(D) Structural statement

87. Which of the following suffices to convert an arbitrary CFG to an LL (1) grammar?

(A) Removing left recursion alone

(B) Factoring the grammar alone

(C) Removing left recursion and factoring the grammar

(D) None of the above

88. Choose the false statements

(A) L = {$a^n b^n a^n$ | n = 1, 2, 3..........| is recursively enumerable

(B) Recursive languages are closed under union

(C) Recursive languages are closed under intersection

(D) Every recursively enumerable language is recursive

89. What is not true w.r.t. channel capacity?

(A) It is related to maximum data rate for a transmission medium

(B) It is concerned with quality of communication channel

(C) It is measured in dB

(D) None of the above

90. The throughput of slotted ALOHA is given by

(A) $S = G$

(B) $S = Ge^G$

(C) $S = Ge^{-G}$

(D) $S = e^G$

91. Which of the following are the data link layer protocols?

(A) Token ring

(B) FDDI

(C) PPP

(D) All of the above

92. _____ are the flow control methods

(A) TDM, CSMA/CD, polling

(B) Stop and wait

(C) Sliding window protocol

(D) All of the above

93. Which of the following device is used to connect similar LAN with the same protocol?

(A) Bridges

(B) Router

(C) Switches

(D) Gateways

94. Match the following List-I with List-II:

List-I

a. TELNET

b. FTP

c. NNTP

d. DNS

List-II

i. Mapping host names on to their network address

ii. Move data efficiently from one machine to another

iii. Allows user on one machine to log into a distant machine and work there

iv. Moving new articles around

Select the correct answer from the options given below:

(A) a-iii   b-i   c-iv   d-ii

(B) a-iii   b-ii   c-iv   d-i

(C) a-iv   b-ii   c-iii   d-i

(D) a-iii   b-ii   c-i   d-iv

95. Match List-I with List-II

List-I : Data Structure Name

a. Linked List

b. Array

c. Tree

d. Graph

List-II : Type

i. Holds many to many relationship

ii. Static data structure

iii. Dynamic data structure

iv. Holds 1 to many relationship

Choose the correct answer from the options given below:

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

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

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

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

96. Match List-I with List-II

List-I : Algorithms

a. Merge Sort

b. Prim's Algorithm

c. Floyd Warshall

d. Hamiltonian Circuit

List-II : Design Paradigms

i. Dynamic Programming

ii. Backtracking

iii. Divide and Conquer

iv. Greedy

Choose the correct answer from the options given below:

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

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

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

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

97. Match List-I with List-II :

List-I

a. Data Flow Based Testing

b. Regression Testing

c. Boundary Value Analysis

d. Beta Testing

List-II

1. Code change has not adversely affected existing features.

2. Structural Testing

3. Performed by clients who are not part of the organization.

4. Functional Testing

Select the correct answer from the options given below:

(A) a - 2 b - 1 c - 4 d - 3

(B) a - 4 b - 2 c - 3 d - 1

(C) a - 2 b - 3 c - 1 d - 4

(D) a - 1 b - 3 c - 2 d - 4

98. Match List-I with List-II:

List-I

a. Inconsistency

b. Deadlock resolution

c. Deadlock Avoidance

d. Transit

List-II

1. Require the recognition of unsafe states

2. A message received by P_j from P_i that is not shown as sent by P_i

3. A message sent by P_i to $P(m_{ij})$ that does not belong to the set of message received by P_j

4. Always requires the abortion of one or more executing processes

Select the most appropriate answer from the options given below:

(A) a-2   b-3   c-4   d-1

(B) a-4   b-2   c-3   d-1

(C) a-2   b-4   c-1   d-3

(D) a-1   b-3   c-2   d-4

99. Match the following List-I with List-II:

List-I

a. Cavalier projection

b. Cabinet projection

c. Isometric projection

d. Orthographic projection

List-II

i. The direction of projection is chosen so that there is no foreshortening of lines perpendicular to the xy plane

ii. The direction of projection is chosen so that lines perpendicular to the xy plane are foreshortened by half their lengths

iii. The direction of projection makes equal angles with all of principal axis

iv. Projection are categorized by the fact that the direction of projection is perpendicular to the view plane.

Select the correct answer from the options given below:

(A) a-iii   b-i   c-iv   d-ii

(B) a-i   b-ii   c-iii   d-iv

(C) a-iv   b-ii   c-iii   d-i

(D) a-ii   b-i   c-iii   d-iv

100. Arrange the following IPv4 datagram fields according to their size (In Ascending order)

1. Version
2. Datagram Length
3. Source IP Address
4. Fragmentation Offset

Choose the correct answer from the below options only:

(A) 1, 2, 3, 4

(B) 1, 4, 2, 3

(C) 2, 1, 4, 3

(D) 1, 4, 3, 2