A

Paper Code : 22 Sr. No. .....

COMPUTER SCIENCE & APPLICATION [Paper-II]

Signature and Name of Invigilator

1. (Signature) _____
   (Name) _____
2. (Signature) _____
   (Name) _____

OMR Sheet No. : .....
(To be filled by the candidate)

Roll No. | | | | | | | | | |
(In Figures as per admission card)

Roll No. _____
(In words)

Time : 1¼ Hours] **[Maximum Marks : 100**

Number of Pages in this Booklet : 8 **Number of Questions in this Booklet : 50**

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. At the commencement of examination, the question bookelt will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (i) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Fault booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
   (ii) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.
   Example : (A) (B) ● (D)
   where (C) is the correct response.
5. Your responses to the items are to be indicated in the Answer Sheet given inside the Paper I Booklet only. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test question booklet and OMR Answer sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
10. Students can take home carbon copy of this OMR answer sheet.
11. Use only Blue/Black Ball point pen.
12. Use of any calculator or log table etc., is prohibited.
13. There is no negative marks for incorrect answers.

परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं।
3. परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी। पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
   (i) कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं। दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें। इसके लिए आपको पाँच मिनट दिये जायेंगे। उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा।
   (ii) इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें।
4. प्रत्येक प्रश्न के लिए चार उत्तर पत्रक विकल्प (A), (B), (C) तथा (D) दिये गये हैं। आपको सही उत्तर के दीर्घवृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है।
   उदाहरण : (A) (B) ● (D)
   जबकि (C) सही उत्तर है।
5. प्रश्नों के उत्तर केवल प्रश्न पत्र I के अन्दर दिये गये उत्तर-पत्रक पर ही अंकित करने हैं। यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें।
8. यदि आप उत्तर-पुस्तिका पर अपना नाम या ऐसा कोई भी निशान करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
9. आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं OMR उत्तर-पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
10. परीक्षा समाप्ति पर परीक्षार्थी OMR उत्तर-पत्रक की कार्बन कापी अपने साथ ले जा सकते हैं।
11. केवल नीले/काले बाल प्वाईंट पेन का ही इस्तेमाल करें।
12. किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है।
13. गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे।

1. Consider the binary relation R = {(x, y), (x, z), (z, x) (z, y)} on the set {x,y,z}. 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

2. Each of the functions $2^{\sqrt{n}}$ and $n^{\log n}$ has a growth rate ..... than that of any exponential function :
   (A) greater (B) less
   (C) equal to (D) uncertain

3. If $n \in N$, then 2^n :
   (A) > n (B) < n
   (C) = n (D) uncertain

4. A graph G is called a ..... if it is a connected acyclic graph :
   (A) Cyclic graph (B) Regular graph
   (C) Tree (D) Not a grpah

5. A five-figure number is formed by the digits 1, 2, 3, 4, 5 without repetition; probability that the number is divisible by 4 is :
   (A) $\frac{1}{3}$ (B) $\frac{1}{4}$
   (C) $\frac{1}{5}$ (D) None of these

6. Suppose that $P(x, y)$ means "x is a parent of y" and $M(x)$ means "x is male". If $F(v, w)$ equals
   $M(v) \wedge \exists x\, \exists y (P(x, y) \wedge P(x, v) \wedge (y \neq v) \wedge P(y, w))$,
   what is the meaning of the expression $F(v, w)$?
   (A) v is a brother of w (B) v is a nephew of w
   (C) v is a uncle of w (D) v is a grandfather of w

7. Which of the following predicate calculus formulas must be true under all interpretations ?
   I. $(\forall x P(x) \vee \forall x Q(x)) \rightarrow \forall x (P(x) \vee Q(x))$
   II. $\forall x (P(x) \vee Q(x)) \rightarrow (\forall x P(x) \vee \forall x Q(x))$
   III. $(\exists x P(x) \vee \exists x Q(x) \rightarrow \exists x (P(x) \vee Q(x)))$
   (A) I only (B) III only
   (C) I and II (D) I and III

8. How many flip-flops are needed to divide the input frequency by 64 ?
   (A) 4 (B) 5
   (C) 6 (D) 8

9. A logic gate has four inputs. The total number of possible input combinations are :
   (A) 4 (B) 8
   (C) 16 (D) 32

10. The fraction 0.6810 is equal to :
(A) 0.010101_2 (B) 0.101_2
(C) 0.10101_2 (D) 0.10111_2

11. What is the implicit pointer that is passed as the first argument for nonstatic member functions?
(A) 'self' pointer (B) std::auto_ptr pointer
(C) 'Mysclf' pointer (D) 'this' pointer

12. Which of the following operator cannot be overloaded ?
(A) = (assignment operator) (B) == (equality operator)
(C) –> (rrow operator) (D) :: (cope resolution operator)

13. A program can be terminated at any time by cally the function :
(A) fflush () (B) ferror ()
(C) exct () (D) clearerre ()

14. Integer Division results in :
(A) Truncation (B) Rounding
(C) Both (a) and (b) (D) None of these

15. The scope of the derived class is within :
(A) Global scope (B) Local scope
(C) In the immediate base class (D) In the abstract class

16. Assume that, in the suppliers relation above, each supplier and each street within a city has a unique name, and (sname, city) forms of candidate key. No other functional dependencies are implied other than those implied by primary and candidate keys. Which one of the following is TRUE about the above schema ?
(A) The schema is in BCNF (B) The schema is in 3NF but not in BCNF
(C) The schema is in 2NF but not in 3NF (D) The schema is not in 2NF

17. By the term "concise code" we understand that the code :
(A) conveys information on item being coded
(B) is of small length
(C) can add new item easily
(D) includes all relevant characteristics of item being coded

18. Relations are used in logical database design because :
(i) sound theory of relations facilitates systematic design of relational databases
(ii) they are very popular
(iii) they are flat files and easy to store and retrieve from computer's memory
(iv) E-R diagrams allow design of relations
(A) i and ii (B) i and iii
(C) ii and iii (D) iii and iv

19. The columns of tables are reffserred :
(A) schema (B) domain
(C) attribute (D) tuple

20. The relation schema student performance (name, course No, Roll No, Grade) has the following functional dependencies :
name, course No → Grade
Roll No., course No → Grade
name → Roll No
Roll No → name
The highest normal form of this relation schema is :
(A) BCNF (B) 4NF
(C) 3NF (D) 2NF

21. The following key values are inserted into a B+–tree in which order of the internal nodes is 3, and that of the leaf nodes is 2, in the sequence given below. The order of internal nodes is the maximum number of tree pointers in each node, and the order of leaf nodes is the maximum number of data items that can be stored in it. The B+–tree in in tially empty.
10, 3, 6, 8, 4, 2, 1
The maximum number of times leaf nodes would get split up as a result of these insertions is :
(A) 2 (B) 6
(C) 4 (D) 5

22. How many different binary trees can be made from three nodes that contain the key values 1,2, and 3 ?
(A) 30 (B) 10
(C) 5 (D) 20

23. The operation that will increase the length of a list is :
(A) Insert (B) Look-up
(C) Modify (D) All of these

24. The logical data structure with a one-to-way relationship is a :
(A) relational (B) chain
(C) network (D) tree

25. The postfix expression for the infix expression :
A + B * (C + D)/F + D * E is
(A) AB + CD + * F / D + E * (B) ABCD + * F / + DE * +
(C) A * B + CD / F * DE ++ (D) A + * BCD / F * DE ++

26. Which of the following statements about Ethernets is typically FALSE ?
(A) Ethernets use circuit switching to send messages
(B) Ethernets use buses with multiple masters
(C) Ethernet protocols use a collision-detection method to ensure that messages are transmitted properly
(D) Networks connected by Ethernets are limited in length to a few hundred meters

27. In the Internet Protocol (IP) suite of protocols, which of the following best describes the purpose of the Address Resolution Protocol ?
(A) To translate Web addresses to host names
(B) To determine the IP address of a given host name
(C) To determine the hardware address of a given host name
(D) To determine the hardware address of a given IP address

28. Which of the following statements about datagrams sent by a node in a network using IPv4 protocol is (are) true ?
I. Datagrams at the source must be the size of the smallest maximum transmission unit (MTU) of all the links on a path to the destination.
II. Datagrams may be fragmented during routing.
III. Datagrams are reassembled only at the destination.
(A) I only (B) II only
(C) II and III (D) III only

29. Which of the following comes closest to being a perfectly secure encryption scheme ?
(A) The Caesar Cipher, a substitution cipher
(B) DES (Data Encryption Standard), a symmetric-key algorithm
(C) Enigma, a transposition cipher
(D) One-time pad

30. One of the header fields in an IP datagram is the Time to Live (TTL) field. Which of the following statements best explains the need for this field ?
(A) It can be used to prioritize packets (B) It can be used to reduce delays
(C) It can be used to optimize throughput (D) It can be used to prevent packet looping

31. Which of the following is NOT the set of regular expression : R = (ab|abb)* bbab :
(A) abbbab (B) ababbabbbab
(C) abababab (D) ab abb bbab

32. Which sentence can be generated by :
$S \rightarrow as|bA$, $A \rightarrow a|ccA$
(A) aa b ccd (B) abcca
(C) abababd (D) None of these

33. Any given transition graph has an equivalent :
(A) NDFSM (B) DFSM
(C) Regular Expression (D) All of these

34. The number of auxiliary memory required for a push down machine (PDM) to behave like a finite state machine (FSM) is :
(A) 4 (B) 1
(C) 2 (D) 0

35. Three address code involves :
(A) exactly 3 addresses (B) at the most 3 addresses
(C) No unary operaters (D) All of the above

36. Assume that a debugger places a breakpoint at a load instruction at virtual address 0×77E81234 (hexadecimal notation) in a debugged process *P*. If the text segment of *P* begins at 0×77E80000 in *P*'s virtual address space and if the debugger has mapped this same text segment at 0×01000000 in its virtual address space, which of the following is the virtual address used by the debugger in its WRITE operation, along with a description of how the debugger has mapped the virtual memory page containing this address ?
(A) 0×01001234 ; page mapped with READ/WRIRTE access
(B) 0×01001234; page mapped with COPY-ON-WRITE access
(C) 0×76E81234 ; page mapped with READ/WRITE access
(D) 0×76 E81234 ; page mapped with COPY-ON-WRITE access

37. On repetitive jobs, rather than coding the same Multiple Virtual Storage/Job Control Language (MVS/JCL) statements over and over, a programmer can define a :
(A) cataloged procedure (B) batch file
(C) shell script (D) job stream

38. A system uses FIFO policy for page replacement. It has 4 page frames with no pages loaded to begin with. The system first accesses 100 distinct pages in some order and then accesses the same 100 pages but now in the reverse order. How many page faults will occur ?
(A) 196 (B) 192
(C) 197 (D) 195

39. Which of the following will compromise system integrity if deleted when uninstalling software?
(A) DLL files shared between applications (B) Data files shared between users
(C) Data files shared between applications (D) DLL files used by one application

40. What does a device driver do ?
(A) Supplies commands that the device can understand
(B) Supplies commands for a group of deivces
(C) Supplies general commands to a device
(D) Supplies general commands for a group of devices

41. In Bohem model, ACT stands for :
(A) Actual change time (B) Annual change time
(C) Actual change traffic (D) Annual change traffic

42. Which one is maintenance model :
(A) CMM (B) Quick fix model
(C) Iterative model (D) None of these

43. In waterfall model user involvement is in :
(A) All phases (B) Some phases
(C) No involvement (D) None of the above

44. Which SDLC includes risk ?
(A) Spiral model (B) Waterfall model
(C) Iterative model (D) None of the above

45. Approach used in top-down analyse and design :
(A) Identify a top-level function and then create a hierarchy of lower level moduless and component
(B) To prepare flowchart (C) Both (A) and (B) (D) None of the above

46. Cloud computing is an extension of distributing computing, the big companies just hype their claims to earn revenue with sophisticated marketing. Really cloud computing is :
(i) Excellent paradigm for an upcoming enterpreneur for getting IAS, SAS & PAS facilities
(ii) It is first old concept of Data Centre
(iii) Cloud needs very high band width without which cloud concept is not good
(iv) It is another form of grid computing.
(A) (i) only (B) (ii) only
(C) (iii) only (D) (i) & (iv)

47. Quantum computing will help to solve the solve simplex problems, but at the same time it will creat security issues because :
(i) Theoretically a Quantum Computer with 32 Qbits can solve a specific problem 2^{32} faster than the present digital computers.
(ii) Present digital computers could take years to break pay of 128 bits, but Q.C can do it in order of
(iii) Coherance of electrons is a great issue in Q.C
(iv) Q. C. could be unwidely to use
(A) (i) only (B) (i) & (ii)
(C) (i), (ii) & (iii) (D) (iv)

48. Green computing is another form of computing because :
(i) It uses green color for all the equipment
(ii) It is very energy efficient & creates minimum e-waste at the time of disposal
(iii) It is a quantum computer
(iv) None of the above
(A) (i) only (B) (ii) only
(C) (iii) only (D) (iv) only

49. We have evolved from structure to object-oriented programming and to component level programming. It is considered a lug leap forward because :
(i) Component based programming help in efficient re-use of the code
(ii) It is easy to program
(iii) Both structured & objective-oriented programming has lot of problem
(iv) None of these
(A) (i) only (B) (ii) only
(C) (iii) only (D) (iv) only

50. Knowledge and experience in parallel algorithm is very important in the present day scenario because :
(i) Most desktops are multicored
(ii) Parallel algorithm improves the efficiency of the code
(iii) In real life we carry out many activities in parallel
(iv) All of the above
(A) (i) only (B) (ii) only
(C) (iii) only (D) (iv) only