Test Paper	: **II**	Test Booklet Serial No. : _____

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Test Subject : **COMPUTER SCIENCE & APPLICATIONS**

Test Subject Code : **K-2417**

Test Booklet Serial No. : _____

OMR Sheet No. : _____

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(Figures as per admission card)

Name & Signature of Invigilator/s

Signature : _____

Name : _____

Paper : **II**
Subject : **COMPUTER SCIENCE & APPLICATIONS**

Time : 1 Hour 15 Minutes   Maximum Marks : 100

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

COMPUTER SCIENCE & APPLICATIONS
Paper – II

Note : This paper contains **fifty (50)** objective type questions. **Each** question carries **two (2)** marks. **All** questions are **compulsory**.

1. ALPHA Company wants to hire 25 programmers to handle system programming job and 40 programmers for application programming of these hired, ten will be expected to perform jobs of both types. How many programmers must be hired ?

   (A) 30   (B) 40

   (C) 45   (D) 55

2. In a relay race there are five teams A, B, C, D and E. What is the probability that A, B and C are the first three to finish (in any order). Assume that all finishing orders are equally likely

   (A) 1/10   (B) 1/20

   (C) 1/30   (D) 1/40

3. A graph G has 21 edges, 3 vertices of degree 4 and other vertices of degree 3. Find the Number of vertices in G.

   (A) 11   (B) 12

   (C) 13   (D) 14

4. Find the hamming distance between X and Y. X = 1100010 Y = 1010001

   (A) 3   (B) 4

   (C) 5   (D) 6

5. The following context – free grammar generates

   $S \rightarrow TaT$

   $T \rightarrow TT \mid aTb \mid bTa \mid a \mid \varepsilon$

   (A) The set of string over the alphabet {a, b} with numbers of a's equal to b's

   (B) The set of string over the alphabets {a, b} with more a's than b's

   (C) The set of string over the alphabet {a, b} with more b's than a's

   (D) The set of string over the alphabet {a, b, c} with a, b, c and ε

6. From a given tautology, another tautology can be derived by interchanging

   (A) 0 and 1

   (B) AND and OR

   (C) 0 and 1 ; AND and OR

   (D) Impossible to derive

7. Negative numbers cannot be represented in

   (A) Sign magnitude form

   (B) 1's complement form

   (C) 2's complement form

   (D) None of the above

8. In the IEEE floating point representation, the hexadecimal value 0x00000000 corresponds to

(A) The normalized value 2^{-127}

(B) The normalized value 2^{-126}

(C) The normalized value +0

(D) The special value +0

9. Consider the following Boolean function of four variables f (w, x, y, z) = Σ (1, 3, 4, 6, 9, 11, 12, 14). The function is

(A) Independent of one variable

(B) Independent of two variables

(C) Independent of three variables

(D) Dependent on all the variables

10. Which of the k map in the figure represents the expression X = AC + BC + B ?

	$\overline{C}$	C
$\overline{A}$ $\overline{B}$	1	1
$\overline{A}$ B	1	1
A B	0	0
A $\overline{B}$	0	0

a

	$\overline{C}$	C
$\overline{A}$ $\overline{B}$	0	1
$\overline{A}$ B	0	0
A B	1	1
A $\overline{B}$	1	1

b

	$\overline{C}$	C
$\overline{A}$ $\overline{B}$	0	0
$\overline{A}$ B	1	1
A B	1	1
A $\overline{B}$	0	1

c

	$\overline{C}$	C
$\overline{A}$ $\overline{B}$	1	1
$\overline{A}$ B	0	1
A B	0	1
A $\overline{B}$	1	1

d

(A) a

(B) b

(C) c

(D) d

11. The operation of a staircase switch best explains the

(A) OR operation

(B) AND operation

(C) Exclusive NOR operation

(D) Exclusive OR operation

12. In a certain machine, the sum of an integer and its 1's complement is $2^{20} - 1$. Then sizeof(int), in bits, will be

(A) 16

(B) 32

(C) Unpredictable

(D) None of the above

13. Consider the following segment of C code mention the number of comparison made in the execution of the loop for any n > 0 is :

```
int j , n ;
    j = 1 ;
while (j < = n)
    j = j * 2 ;
```

(A) $[\log_2 n] + 1$

(B) n

(C) $[\log_2 n]$

(D) None of the above

14. The function that is actually created from a call to a template function is said to be

(A) Generated   (B) Inherited

(C) Spawned   (D) Declassified

15. Consider the following C declaration
struct {
        short S [5] ;
        union {
                float y ;
                long z;
                } u;
        } t;
Assume that objects of the type short, float and long occupy 2 bytes, 4 bytes and 8 bytes respectively. The memory equipment for variable t, ignoring alignment consideration, is

(A) 22 bytes   (B) 14 bytes

(C) 18 bytes   (D) 10 bytes

16. Which one of the following is not included in the classical E-R models ?

(A) Entities

(B) Relationships

(C) Integrity Constraints

(D) Attributes

17. Let R be a relation with attributes (A, B, C, D, E, F) and let the following functional dependencies hold

A → B

A → C

CD → E

CD → F

B → E

Given the above functional dependencies which of the following functional dependencies does not hold ?

(A) A → E   (B) CD → EF

(C) AD → F   (D) B → CD

18. Consider the table student (Sno, Same, Cname, Cno) where (Sno, Cno) and (Sname, Cname) are the candidates keys of the relation. Which one of the following is not true ?

(A) The above table is in 1NF

(B) The above table is in 2NF

(C) The above table is in 3NF

(D) The above table is in BCNF

19. SQL provides a number of special aggregate functions. Which one of the following is not included in SQL ?

(A) COUNT   (B) SUM

(C) MEDIAN   (D) MIN

20. Consider the following query

SELECT student_id FROM enrolment;

There are 100 students and 500 enrolments although 5 students have not yet enrolled in any course. The number of rows returned by the above query is

(A) 100

(B) 500

(C) 95

(D) Unable to determine

21. In a complete binary tree of n nodes, how far are the most distant nodes ? Assume each in the path count as 1.

(A) About $\log_2(n)$

(B) About $2 \log_2(n)$

(C) About $3 \log_2(n)$

(D) About $4 \log_2(n)$

22. If memory for the run-time stack is only 150 cells (words), how big can N be in Factorial (N) before encountering stack overflow ?

(A) 24   (B) 15

(C) 66   (D) 50

23. A digital search tree is implemented as a tree with n nodes each of which can contain m pointers, corresponding to the m possible symbols in each position of the key. The number of nodes that must be accessed to find a particular key is

(A) m   (B) m^n

(C) n   (D) $\log m^n$

24. The extra key inserted at the end of the array is called a

(A) End key

(B) Stop key

(C) Sentinel

(D) Transposition

25. A hash function f defined as f (key) = key mod 7, with linear probing, insert the keys 37, 38, 72, 48, 98, 11, 56, into a table indexed from 11 will be stored in the location

(A) 3   (B) 4

(C) 5   (D) 6

26. Imagine the length of a 10Base – 5 cable is 100 meters. If the speed of propagation in a thick co-axial cable is 60% of the speed of light, how long does it take for a bit to travel from the beginning to the end of the cable ? Ignore any propagation delay in the equipment. The speed of light $= 3 \times 10^8$ meters/sec.

(A) 3.33×10^{-7} sec

(B) 4.44×10^{-7} sec

(C) 5.55×10^{-7} sec

(D) 6.66×10^{-7} sec

27. The _____ is a circuit switched network, while the _____ is a packet switched network.

(A) Telephone, ATM

(B) SONET and FDDI

(C) Satellite, Telephone

(D) FDDI and SONET

28. Broadband ISDN handles data rate of about

(A) 64 Kbps   (B) 100 Mbps

(C) 5.4 Mbps   (D) 1.2 Mbps

29. Which command could be used at the command line interface to troubleshoot LAN connectivity problems on a router ?

(A) tracert   (B) ipconfig

(C) winipcfg   (D) ping

30. Which statement about an IP network is true ?

(A) A broadcast source MAC contains all zeros

(B) A MAC address is part of the physical layer of the OSI model

(C) MAC addresses are used by bridges to make forwarding decisions : IP address are used by routers

(D) IP address are a flat addressing scheme : MAC addresses use a hierarchical addressing scheme

31. In a two-pass assembler, adding literals to resolution of local table and address resolution of local symbols are done during

(A) First pass and second pass respectively

(B) Second pass

(C) Second pass and first pass respectively

(D) First pass

32. Privileged instruction can be executed

(A) Only in monitor mode

(B) Only in user mode

(C) Both in user and monitor mode

(D) None of the above

33. For the following code

MVI A, 1DH

SIM

After the SIM is executed, which are the interrupts that are masked

(A) 6.5, 3.5   (B) 8.5, 6.5

(C) 7.5, 5.5   (D) 4.5, 3.5

34. The string 1101 does not belong to the set represented by

(A) 110* (0 + 1)

(B) (10)* (01)* (00 + 11)*

(C) 1(0 + 1)* 101

(D) 1 (10 + 01)* (1 + 0)*

35. Correctly match the following pairs and determine the answer from the code given below :

  a. Activation record 1. Linkage loader

  b. Location counter 2. Garbage collection

  c. Reference counts 3. Subroutine call

  d. Address relocation 4. Assembler

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

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

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

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

36. Which of the following statements are true ?

  1. Shortest remaining time first scheduling may cause starvation.

  2. Preemptive scheduling may cause starvation.

  3. Round robin is better than FCFS in terms of response time.

  4. Thrashing reduces page I/O

(A) 1 only

(B) 1 and 2 only

(C) 1, 2 and 3 only

(D) All of the above

37. 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 reverse order. How many page faults will occur ?

(A) 196   (B) 192

(C) 197   (D) 195

38. Which of the following disk scheduling methods is most likely to lead to starvation for requests on inner or outer cylinders ?

(A) FCFS   (B) SSTF

(C) SCAN   (D) C-SCAN

39. A process executes the following code

for (i = 0; i < n; i++)

fork( );

The total number of child processes created is

(A) n (B) 2^{n-1}

(C) 2^n (D) $2^{n+1} - 1$

40. An attempt to read from a locked file results in

(A) Prematured termination

(B) A deadlock

(C) An indefinite wait

(D) None of the above

41. Design phase include

(A) Data architectural and procedural design only

(B) Architectural, procedural and interface design only

(C) Data, architectural and interface design only

(D) Data, architectural, interface and procedural design only

42. The cyclomatic complexity metric provides the designer with information regarding the number of

(A) Cycles in the program

(B) Errors in the program

(C) Independent logic paths in the program

(D) Statements in the program

43. PERT and CPM provide quantitative tools that do not allow the software planner to

(A) Determine the critical path

(B) Establish probable time estimates

(C) Assemble and deliver time-lines

(D) Calculate boundary times for a particular task

44. Coupling is a measure of

(A) Relative functional strength

(B) Interdependence among module

(C) Both of the above

(D) None of the above

45. If a process is under statistical control, then it is

(A) Maintainable

(B) Measurable

(C) Predictable

(D) Verifiable

46. _____ is a group of loosely coupled computers that work together closely, so that in some respects they can be regarded as a single computer.

(A) Distributed computing

(B) Cluster computing

(C) Massive parallel processing

(D) Grid computing

47. _____ of the received radio signals in a mobile communication environment occurs because of multi-path propagation.

(A) Shading

(B) Fading

(C) Modulation

(D) Demodulation

48. An e-business that allows consumer to name their own price for products and services is following which e-business model ?

(A) B2B (B) B2G

(C) C2C (D) C2B

49. Choose the correct statements

1. In the K-means clustering algorithm, the first row of the distance matrix corresponds to the distance of each object to the first centroid and the second row is the distance of each object to the second centroid.

2. In the first step of hierarchical clustering algorithm, each cluster generated will have just one item in it.

(A) Statements 1 and 2 are true

(B) Statements 1 and 2 are false

(C) Statement 1 is true and 2 is false

(D) Statement 1 is false and 2 is true

50. To specify the size of window which of the following syntax is used ?

(A) sizeof(WNDCLASSEX)

(B) sizeof(WNDCLASS)

(C) both (A) and (B)

(D) neither (A) and (B)

Space for Rough Work