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The following details **MUST** be filled by the candidate:

Application ID	
Reservation category	
Candidate's name	
Post applied for	Scientific/Technical Officer
Mobile number	
Date	18.02.2021
Signature of candidate	
Signature of invigilator	

Instructions:

1. This question paper contains 50 MCQs. Each question carries 1 mark.
2. Candidate is required to return this question-cum-answer booklet to the invigilator before leaving the hall.
3. The duration of written test is 2 hours
4. Candidate is required to write his/her choice (e.g., **a** or **b** or **c** or **d**) in the column of "My Answer". Inappropriate actions such as writing more than one choice, writing the choice in an ambiguous manner, etc. will be awarded 0 mark corresponding to that question.

Question No.	Question	My Answer
1.	Which of the following can't be considered as deadlock prevention scheme? (a) Number the resources uniquely and never request a lower numbered resource than the last one requested. (b) Release all resources before requesting a new resource. (c) Never request a resource after releasing any resource. (d) Request and all required resources be allocated before execution.	
2.	Banker's algorithm is used (a) To prevent deadlock (b) To deadlock recovery (c) To solve the deadlock (d) None of these	

3.	Consider a machine with 64 MB physical memory and a 32-bit virtual address space. If the page size is 4KB, what is the approximate size of the page table? (a) 2 MB (b) 8 MB (c) 16 MB (d) 24 MB	
4.	Suppose the time to service a page fault is on the average 10 milliseconds, while a memory access takes 1 microsecond. Then a 99.99% hit ratio results in average memory access time of (a) 1.9999 milliseconds (b) 1 millisecond (c) 9.999 microseconds (d) 1.9999 microseconds	
5.	Which of the following page replacement algorithms suffers from Belady's anomaly? (a) LRU (b) FIFO (c) Both LRU and FIFO (d) None	
6.	Consider a set of n tasks with known runtimes $r_1, r_2, \dots, r_n$ to be run on a uniprocessor machine. Which of the following processor scheduling algorithms will result in the maximum throughput? (a) Round-Robin (b) Shortest-Job-First (c) Highest-Response-Ratio-Next (d) First-Come-First-Served	
7.	A file system with 300 GByte uses a file descriptor with 8 direct block address, 1 indirect block address and 1 doubly indirect block address. The size of each disk block is 128 Bytes and the size of each disk block address is 8 Bytes. The maximum possible file size in this file system is (a) 3 Kbytes (b) 35 Kbytes (c) 280 Bytes (d) Dependent on the size of the disk	
8.	The maximum number of processes that can be in ready state for a computer system with n CPUs is (a) n (b) n^2 (c) 2^n (d) Independent of n	

9.	Let the time taken to switch between user and kernel modes of execution be t_1 while the time taken to switch between two processes be t_2. Which of the following is TRUE? (a) $t_1 > t_2$ (b) $t_1 = t_2$ (c) $t_1 < t_2$ (d) Nothing can be said about the relation between t_1 and t_2	
10.	Consider a disk system with 100 cylinders. The requests to access the cylinders occur in following sequence: 4, 34, 10, 7, 19, 73, 2, 15, 6, 20. Assuming that the head is currently at cylinder 50, what is the time taken to satisfy all requests if it takes 1ms to move from one cylinder to adjacent one and shortest seek time first policy is used? (a) 95ms (b) 119ms (c) 233ms (d) 276ms	
11.	There are 10 different processes running on a workstation. Idle processes are waiting for an input event in the input queue. Busy processes are scheduled with the Round-Robin time sharing method. Which out of the following quantum times is the best value for small response times, if the processes have a short runtime, e.g. less than 10ms? (a) $t_Q = 15\text{ms}$ (b) $t_Q = 40\text{ms}$ (c) $t_Q = 45\text{ms}$ (d) $t_Q = 50\text{ms}$	
12.	Threads of a process share (a) global variable but not heap (b) heap but not global variables (c) neither global variables nor heap (d) both heap and global variables	
13.	The maximum length (in bytes) of an IPv4 datagram is? (a) 2 (b) 1024 (c) 65535 (d) 512	
14.	The IP network 192.168.50.0 is to be divided into 10 equal sized subnets. Which of the following subnet masks can be used for the above requirement? (a) 255.243.240 (b) 255.255.0.0 (c) 255.255.0 (d) 255.255.255	

15.	Which of the following is correct IPv4 address? (a) 124.201.3.1.52 (b) 01.200.128.123 (c) 300.142.210.64 (d) 128.64.0.0	
16.	The location of a resource on the Internet is given by its? (a) Protocol (b) URL (c) E-mail address (d) ICQ	
17.	The protocol data unit(PDU) for the application layer in the Internet stack is (a) Segment (b) Datagram (c) Message (d) Frame	
18.	In the IPv4 addressing format, the number of networks allowed under Class C addresses is (a) 2^{14} (b) 2^7 (c) 2^{21} (d) 2^{24}	
19.	Read the given C++ program carefully and choose the correct output from the given options: #include <iostream> #include <string> using namespace std; int main() { cout<<rank<int[10]>::value; // Case A cout<<rank<char[10][10]>::value; // Case B cout<<rank<string[10][10][10]>::value; //Case C return 0; } (a) 121 (b) 321 (c) 123 (d) 010	
20.	After the update in the previous question, the link N1-N2 goes down. N2 will reflect this change immediately in its distance vector as cost, ∞ . After the NEXT ROUND of update, what will be cost to N1 in the distance vector of N3?	

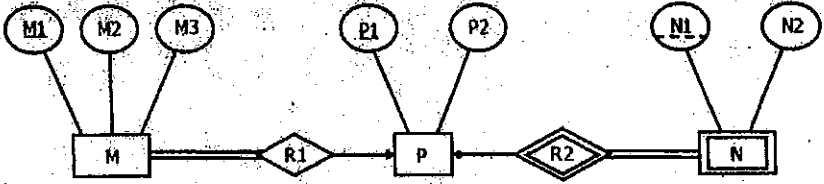
	(a) 3 (b) 9 (c) 10 (d) ∞	
21.	Suppose computers A and B have IP addresses 10.105.1.113 and 10.105.1.91 respectively and they both use the same netmask N. Which of the values of N given below should not be used if A and B should belong to the same network? (a) 255.255.255.0 (b) 255.255.255.128 (c) 255.255.255.192 (d) 255.255.255.224	
22.	Packets of the same session may be routed through different paths in: (a) TCP, but not UDP (b) TCP and UDP (c) UDP, but not TCP (d) Neither TCP nor UDP	
23.	Which of the following formula in excel is correct to calculate sum of cell B1, B2 and B3? (a) =Sum(B1>B3) (b) =Sum(B1:B3) (c) =Sum(B1,B3) (d) =Sum(B1;B3)	
24.	An organization has a class B network and wishes to form subnets for 64 departments. The subnet mask would be: (a) 255.255.0.0 (b) 255.255.64.0 (c) 255.255.128.0 (d) 255.255.252.0	
25.	Suppose the round trip propagation delay for a 10 Mbps Ethernet having 48-bit jamming signal is 46.4 ms. The minimum frame size is: (a) 94 (b) 416 (c) 464 (d) 512	
26.	If a class B network on the Internet has a subnet mask of 255.255.248.0, what is the maximum number of hosts per subnet? (a) 1022 (b) 1023 (c) 2046 (d) 2047	

27.	What happens when you click on Insert >> Picture >> Clip Art? (a) It inserts a clipart picture into document (b) It lets you choose clipart to insert into document (c) It opens Clip Art taskbar (d) None of above	
28.	What is the output of the following code. <pre>#include <stdio.h> #define PRINT(i, limit) do { if(i++ < limit) { printf("foo"); continue; } }while(1) intmain() { PRINT(0, 3); return0; }</pre> (a) 1 (b) 3 (c) 4 (d) Compiler error	
29.	Which of the following is the superclass of all errors and exceptions in Java (a) RunTimeExceptions (b) Throwable (c) Catchable (d) none of these	
30.	What is the output of the following code. <pre>intmain() { floatarr[5] = {12.5, 10.0, 13.5, 90.5, 0.5}; float*ptr1 = &arr[0]; float*ptr2 = ptr1 + 3; printf("%f ", *ptr2); printf("%d", ptr2 - ptr1); return0; }</pre>	

	(a) 90.500000 3 (b) 90.500000 12 (c) 10.000000 12 (d) 0.500000 3	
31.	Which of the following is true about inheritance in Java 1) Private methods are final 2) Protected members are accessible within a package and inherited classes outside the package 3) Protected methods are final 4) We can not override private methods a) 1,2 and 4 b) Only 1 and 2 c) 1, 2 and 3 d) 2, 3 and 4	
32.	What will be the Output of following program? <pre>#include <stdio.h> intfuncf (int x); intfuncg (int y); main() { int x = 5, y = 10, count; for (count = 1; count <= 2; ++count) { y += funcf(x) + funcg(x); printf ("%d ", y); } } funcf(int x) { int y; y = funcg(x); return (y); } funcg(int x) { static int y = 10; y += 1; return (y+x); }</pre> (a) 43 80 (b) 42 74 (c) 33 37 (d) 32 32	

33.	Consider the following JAVA program. Predict the output <pre> class Test { public static void swap(Integer i, Integer j) { Integer temp = new Integer(i); i = j; j = temp; } public static void main(String[] args) { Integer i = new Integer(10); Integer j = new Integer(20); swap(i, j); System.out.println("i = " + i + ", j = " + j); } } </pre> a) i=10, j=20 b) i=20, j=10 c) i=10, j=10 d) i=20, j=20	
34.	Consider the following program: <pre> intf(int *p, int n) { if (n <= 1) return 0; else return max(f(p+1, n-1), p[0]-p[1]); } intmain() { inta[] = {3,5,2,6,4}; printf("%d", f(a,5)); } </pre> What is the output: (a) 2 (b) 3 (c) 4 (d) 5	
35.	Consider the following program written in pseudo-code. Assume that x and y are integers. <pre> Count (x, y) { if (y != 1) { if (x != 1) { print("*"); Count (x/2, y); } else { y=y-1; Count (1024, y); } } } </pre>	

	The number of times that the print statement is executed by the call Count(1024, 1024) is (a) 10230 (b) 10 (c) 1023 (d) 23010	
36.	Consider the following C code. <pre>#include void main() { double pi = 3.1415926535; int a = 1; inti; for(i=0; i< 3; i++) if(a = cos(pi * i/2)) printf("%d ",1); else printf("%d ", 0); }</pre> What is the output? (a) 000 (b) 010 (c) 101 (d) 111	
37.	Which of the following is true ? (a) Every relation in 3NF is also in BCNF (b) A relation R is in 3NF if every non-prime attribute is fully functionally dependent on every key of R (c) Every relation in BCNF is also in 3NF (d) No relation can in both BCNF and 3NF	
38.	Consider the following transactions with data items P and Q initialized to zero: <pre>T1: read (P) ; read (Q) ; if P = 0 then Q := Q + 1 ; write (Q) ; T2: read (Q) ; read (P) ; if Q = 0 then P := P + 1 ; write (P) ;</pre> Any non-serial interleaving of T1 and T2 for concurrent execution leads to (a) A serializable schedule (b) A schedule that is not conflict serializable	

	(c) A conflict serializable schedule (d) A schedule for which a precedence graph cannot be drawn	
39.	Which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock? I. 2-phase locking II. Time-stamp ordering (a) I only (b) II only (c) Both I and II (d) Neither I nor II	
40.	Given the basic ER and relational models, which of the following is INCORRECT? (a) An attribute of an entity can have more than one value (b) An attribute of an entity can be composite (c) In a row of a relational table, an attribute can have more than one value (d) In a row of a relational table, an attribute can have exactly one value or a NULL value	
41.	Consider the following ER diagram.  The minimum number of tables needed to represent M, N, P, R1, R2 is (a) 2 (b) 3 (c) 4 (d) 5	
42.	Given the relations employee (name, salary, dept-no), and department (dept-no, dept-name, address) Which of the following queries cannot be expressed using the basic relational algebra operations (σ , π , $\times$, $-$, $\cup$, ρ) (a) Department address of every employee (b) Employees whose name is the same as their department name (c) The sum of all employees' salaries (d) All employees of a given department	
43.	In a schema with attributes A, B, C, D and E following set of functional dependencies are given $A \rightarrow B$ $A \rightarrow C$ $CD \rightarrow E$ $B \rightarrow D$ $E \rightarrow A$ Which of the following functional dependencies is NOT implied by the above set? (a) $CD \rightarrow AC$	

- (b) $BD \rightarrow CD$
- (c) $BC \rightarrow CD$
- (d) $AC \rightarrow BC$

44. An aggregation association is drawn using which symbol?
- (a) A line which loops back on to the same table
 - (b) A small open diamond at the end of a line connecting two tables
 - (c) A small closed diamond at the end of a line connecting two tables
 - (d) A small closed triangle at the end of a line connecting two tables

45. Every time the attribute A appears, it is matched with the same value of attribute B but not the same value of attribute C. Which of the following is true?
- (a) $A \rightarrow (B, C)$
 - (b) $A \rightarrow B, A \twoheadrightarrow C$
 - (c) $A \rightarrow B, C \twoheadrightarrow A$
 - (d) $A \twoheadrightarrow B, B \rightarrow C$

46. Suppose database table $T1(P, R)$ currently has tuples $\{(10, 5), (15, 8), (25, 6)\}$ and table $T2(A, C)$ currently has $\{(10, 6), (25, 3), (10, 5)\}$. Consider the following three relational algebra queries $RA1, RA2$ and $RA3$: $RA1 : T1 \bowtie T1.P = T2.A \ T2$ where $\bowtie$ is natural join symbol $RA2 : T1 \bowtie T1.P = T2.A \ T2$ where $\bowtie$ is left outer join symbol $RA3 : T1 \bowtie T1.P = T2.A$ and $T1.R = T2.C \ T2$ The number of tuples in the resulting table of $RA1, RA2$ and $RA3$ are given by:
- (a) 2, 4, 2 respectively
 - (b) 2, 3, 2 respectively
 - (c) 3, 3, 1 respectively
 - (d) 3, 4, 1 respectively

47. Consider the tables given below.

Table A

Id Name Age

 12 Arun 60
 15 Shreya 24
 99 Rohit 11

Table B

Id Name Age

 15 Shreya 24
 25 Hari 40
 98 Rohit 20
 99 Rohit 11

Table C

	Id Phone Area ----- 10 2200 02 99 2100 01 How many tuples does the result of the following SQL query contains? SELECT A.id FROM A WHERE A.age > ALL (SELECT B.age FROM B WHERE B.name = "arun") (a) 4 (b) 3 (c) 0 (d) 1	
48.	The given Query can also be replaced with _____: SELECT name, course_id FROM instructor, teaches WHERE instructor_ID = teaches_ID; (a) Select name, course_id from teaches, instructor where instructor_id = course_id; (b) Select name, course_id from instructor natural join teaches; (c) Select name, course_id from instructor; (d) Select course_id from instructor join teaches;	
49.	Which one of the following given statements possibly contains the error? (a) select * from emp where empid = 10003; (b) select empid from emp where empid = 10006; (c) select empid from emp; (d) select empid where empid = 1009 and Lastname = 'GELLER';	
50.	In the following Query, which of the following can be placed in the Query's blank portion to display the salary from highest to lowest amount, and sorting the employs name alphabetically? SELECT * FROM instructor ORDER BY salary ____, name ____; (a) Ascending, Descending (b) Asc, Desc (c) Desc, Asc (d) All of the above	

Key

1. (c)

2. (c)

3. (a)

4. (d)

5. (b)

6. (b)

7. (b)

8. (d)

9. (c)

10. (b)

11. (a)

12. (d)

13. (c)

14. (c) X

15. (d) ✓

16. (b)

17. (c)

18. (c)

19. (c)

20. (c) X

21. (d)

22. (b)

23. (b)

24. (d)

25. (c)

26. (c)

27. (c)

28. (d)

29. (b)

30. (a)

31. (a)

32. (a)

33. (a)

34. (b)

35. (a)

36. (c)

37. (c)

38. (b)

39. (b)

40. (c)

41. (b)

42. (c)

43. (b)

44. (b)

45. (b)

46. (b)

47. (b)

48. (b)

49. (d)

50. (c)