GATE 2022

CS & IT Engineering

Questions & Answers (Memory Based)

(MEMORY BASED)

1. $\lim\limits_{x \to 0^+} \dfrac{\sqrt{x}}{-e^{2\sqrt{x}}}$

Find the limit

[NAT: 1 Mark]

Ans. -0.5

2. A is n × m and B is m × n matrix C and D are n × n

S1: Tr(AB) = Tr(BA)

S2: Tr(CD) = Tr(DC)

[MCQ: 1 Mark]

A. S1 is correct   B. S2 is correct

C. Both correct   D. Both wrong

Ans. C

3. $A = \begin{bmatrix} -9 & -6 & -2 & -4 \\ -8 & -6 & -3 & -1 \\ 20 & 15 & 8 & 5 \\ 32 & 21 & 7 & 12 \end{bmatrix}$

[MSQ: 2 Marks]

A. $\begin{bmatrix} -1 \\ 0 \\ -2 \\ 2 \end{bmatrix}$ B. $\begin{bmatrix} 1 \\ 0 \\ -1 \\ 0 \end{bmatrix}$

C. $\begin{bmatrix} -1 \\ 1 \\ 0 \\ 1 \end{bmatrix}$ D. $\begin{bmatrix} 0 \\ 1 \\ -3 \\ 0 \end{bmatrix}$

Ans. A, C, D

4. $y(x) = \begin{bmatrix} 2 & 0 & x \leq \dfrac{1}{3} \\ 3 & \leq & x \leq \dfrac{3}{4} \\ 1 & \dfrac{3}{4} & \leq x \ 1 \end{bmatrix}$

Area = ?

[NAT: 2 Marks]

Ans. 2.16

5. $x^2 + 2x + 6 = 0$ find root and calculate the following equation (r + 2) (r + 3) (r + 4) (r + 5)

[MCQ: 2 Mark]

A. −51   B. + 51

C. − 126   D. +126

Ans. C

6. The ___ is too high for to be considered ___

[MCQ: 1 Mark]

A. Fare/fare   B. Fair/Fair

C. Fare/fair   D. Fair/Fare

Ans. C

7. Consider the corner and mid to the triangle P, Q, R, S, T, U, not necessary in this order.

(i) P and R are parallel to S and T

(ii) S and u not adjacent

(iii) P is the side corner at T

[MCQ: 2 Marks]

A. P cannot be in mid

B. S cannot be in corner

C. R cannot be in corner

D. U cannot be in the corner
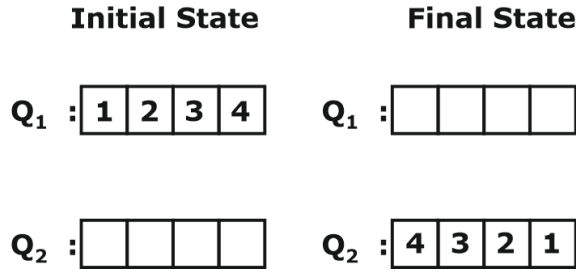
Ans. B

8. Examine the following statements:

(i) All children are inquisitive

(ii) Some children are inquisitive

(iii) No children are inquisitive

(iv) Some children are not inquisitive

Among these statements the two statements which cannot both be true simultaneously, but can both be false, would be

[MCQ: 2 Marks]

A. (i) and (iii)   B. (i) and (iv)

C. (ii) and (iii)   D. (iii) and (iv)

Ans. A

9.

Initial State   **Final State**

Q_1 : | 1 | 2 | 3 | 4 | Q_1 : | | | | |

Q_2 : | | | | | Q_2 : | 4 | 3 | 2 | 1 |

Consider two queues Q1 and Q2 such that initially Q1 contains 4 elements (1, 2, 3, 4) and Q2 is empty. The only operation allowed is enqueue and dequeue.

What is the minimum number of Enqueue operations required on Q1 to transfer the elements of Q1 to Q2 in reverse order?

[NAT: 2 Marks]

Ans. 6

10. Consider a 3-Dimensional array:

include <Stdio.h>

void main ()

A [3] [3] [3] = {{1, 2, 3, 4, 5, 6, 7, 8, 9}

{10, 11, 12, 13, 14, 15, 16, 17, 18}

{19, 20, 21, 22, 23, 24, 25, 26, 27};

int i = 0, j = 0, k = 0 ;

for (i = 0 ; i < 3 ; i + +)

  for (k = 0 ; k < 3 ; k + +).
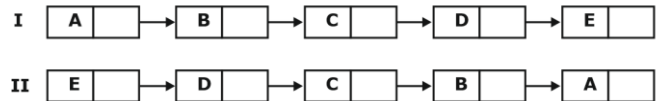
  printf ("%d", a [i] [j] [k]) ;

[MCQ: 2 Marks]

A.

1   2   3

10   11   12

19   20   21

B.

4   5   6

7   8   9

10   11   12

C.

1   2   3

10   11   12

16   17   18

D. None

Ans. A

11. Consider 2 linked list:

I   [A] → [B] → [C] → [D] → [E]

II [E] → [D] → [C] → [B] → [A]

What is the time complexity to get reverse of linked list I as II by using best algorithms and space complexity 0(1)?

[MCQ: 2 Marks]

A. 0(1)

B. 0(n)

C. 0(n²)

D. Not possible in O(1) space complexity

Ans. B

12. int x = 1;

  int *P;

  P = &x;

  *P = 10;

  int Z[2] = {10, 11};

  P = &Z[1];

  *(&Z[0] + 1)+ = 3;

  printf("%d %d &d", x, Z[0], Z[1];

[MCQ: 1 Mark]

A. 1   10   11

B. 10   10   14

C. 1   10   11

D. 10   11   14

Ans. B

13. Consider following address www.gate.co.in what is number of DNS pairwise response to access the address?

[NAT: 1 Mark]

Ans. 2

14. Consider between = 100 Mbps

Packet size = 1000 bytes

Speed = 3×10^8 m/s

Length = 2100 km

What will be the time (in millisecond round off to 2 decimal place) to reach packet to the destination?

[NAT: 1 Mark]

Ans. 7.08

15. R (A B C D E)

AB $\rightarrow$ C

BC $\rightarrow$ D

C $\rightarrow$ E

Find the number of super keys

[NAT: 1 Mark]

Ans. 8

16. In a relational data model which of the following statements is true

[MCQ: 2 Marks]

A. BCNF Decomposition preserve functional dependency

B. If all attribute of relation are prime attributes, then relation is in BCNF

C. Every relation has at least one nonprime attribute

D. A relation with only two attributes is always in BCNF.

Ans. D

17. 10 vertices, what is max no of edges in disconnected graph?

[NAT: 1 Mark]

Ans. 36

18. Let R_1 and R2 be 4-bit register that stores number in 2's complement form for the operation R1 +R2 which of following values of R_1 and R_2 gives overflow?

A. R_1 = 0011 R_2 = 0010

B. R_1 = 1101 R_3 = 1001

C. R_1 = 1011 R_2 = 1110

D. R_1 = 0011 R_2 = 0100

[MCQ: 1 Mark]

Ans. B

19.

$S \rightarrow S$

$S \rightarrow S + R$

$R \rightarrow R * P / P$

$P \rightarrow (S) / id$

If $I_0 [S' \rightarrow \cdot S, S \rightarrow S \cdot + R]$,

Then the number of productions in (goto (closure $(I_0, +)$) is

[NAT: 1 Mark]

Ans. 5

20. $S \rightarrow, \# T(S \cdot val = S_1 \cdot val \times T \cdot val)$

$S \rightarrow T (S \cdot val = T \cdot val)$

$T \rightarrow, \% R (T.val = T_1 \cdot val \div R \cdot val)$

$T \rightarrow R (T \cdot val = R \cdot val)$

$R \rightarrow id (R \cdot val = id \cdot val)$

Then the value of $20 \# 10 \% 5 \# 8 \% 2 \% 2$

[NAT: 2 Marks]

Ans. 80

21. Which of the following give the maximum throughput for transferring data from hard disk to main memory

[MCQ: 1 Mark]

A. DMA   B. Interrupt driven I/O

C. Programmed I/O   D. Polling based I/O

Ans. A

22. Consider 2 kB each, 64 kB main memory and 16-bit word, words P, Q, R, S are accessed 10 times in the order PQRS PQRS, P=A248, Q=CA8A, R=C28A, S=A262

Which of the following is true?

[MCQ: 2 Marks]

A. P is never replaced

B. S and Q remain in memory after completion of execution

C. Q is replaced every time when R is accessed

D. None

Ans. C

23. Consider the following 3 threads T_1, T_2, & T_3. T_1 has semaphore S_1, T_1 has semaphore S_2 and T_3 has semaphore S_3, each semaphore has following codes

T_1	T_2	T_3
White (True)	White (True)	White (True)
{	{	{
Wait (S_3)	Wait (S_1)	Wait (S_2)
Print ("C")	Print ("B")	Print ("A")
Signal (S_2)	Signal (S_3)	Signal (S_1)
}	}	}

Which of the following given o/p "BCABCABCA"

A. $S_1=1$, $S_2=0$, $S_3=0$

B. $S_1=1$, $S_2=1$, $S_3=1$

C. $S_1=0$, $S_2=1$, $S_3=1$

D. $S_1=1$, $S_1=1$, $S_1=1$

[MCQ: 2 Marks]

Ans. A

24. Consider the following 32-bit IEEE precision format. These are 3 registers namely R_A, R_B & R_C store the value of A, B and C.

R_A = C1400000

R_B = C2100000

R_C = 41400000

Which one is correct?

A. C = A + B

B. B = A + 2C

C. A – B > 0

D. B = 3C

[MCQ: 1 Mark]

Ans. A

25. What is the arrangement of 6 identical balls in 3 identical boxes?

[NAT: 1 Mark]

Ans. 28

26. Which of the following is true?

A. Symbol table is accessed only during lexical analysis.

B. LR(1) can parse any DCFL

C. Data flow analysis is used for runtime memory.

D. if LR(1) has no reduce-reduce conflict, then LALR(1) also won't have

[MCQ: 1 Mark]

Ans. B

27. L_1 = ww {wϵ (a, b)}

L_2 = a^n w a^n {wϵ {a, b}*, n > 0}

A. L_1 and L_2 both context free but not regular

B. L_1 and L_2 both are regular

C. L_1 and L_2 both are CFL

D. None of these

[MCQ]

Ans. D

28. There are 5 balls in a bag, 3 green and 2 orange. If we pick one ball and ball is green, then no ball is replace with orange ball. Now another ball is picked. Find probability of getting orange ball.

A. 1/2   B. 19/50

C. 23/50   D. 2/25

[MCQ: 2 Marks]

Ans. C

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