Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SIXTH SEMESTER B.TECH DEGREE COMPREHENSIVE EXAMINATION, MAY 2019

Course Code: IT352

Course name: COMPREHENSIVE EXAM (IT)

Max. Marks: 50 Duration: 1 Hour

Instructions: ***(1) Each question carries one mark. No negative marks for wrong answers***
(2) Total number of questions: 50
(3) All questions are to be answered. Each question will be followed by 4 possible answers of which only ONE is correct.
(4) If more than one option is chosen, it will not be considered for valuation.
(5) Calculators are not permitted

PART A- COMMON COURSES

1. The slope of the surface $z = xe^{-y} + 5y$ in the x-direction at the point (4,0) is

   a) 0 b) -1 c) 1 d) 2

2. The solution of $(D^2 + 1)y = 0$ is

   a) $c_1 \cos x + c_2 sin\, x$ b) $c_1 e^x + c_2 e^{-x}$ c) $(c_1 + c_2 x)e^x$ d) $(c_1 + c_2 x)e^{-x}$

3. A simple spring mass vibrating system has a natural frequency of N. if the spring stiffness is halved and the mass is doubled then the natural frequency will be

   a) N b) 0.5N c) 2N d) 0.25N

4. The proportion of second moment of area about centroidal axis to second moment of area about base of a rectangle will be

   a) 0.3 b) 0.1 c) 0.25 d) 0.08333

5. An algorithm for scheduling a set of project activities:

   a) Critical Path Method b) Crucial Practicing Method c) Centre Processing Method d) None

6. The fundamental rethinking and radical redesign of the business process to achieve dramatic improvements in critical contemporary measures of performances such as cost,quality,service and speed:

   a) Recycling b) Quality engineering c) Contemporary design d) Re - engineering

7. Composting is

   a) anaerobic degradation process for solid waste treatment b) anaerobic treatment for sullage c) aerobic treatment for sewage d) an aerobic degradation process for solid waste treatment

8. The rating system of India which is focussed on conservation and efficient energy use is

a) GRIHA b) LEED India c) IGBC d) BEE

9. In orthographic projection, each projection view represents how many dimensions of an object?

a) 1 b) 2 c) 3 d) 0

10. The front view, side view and top view of a cylinder standing on horizontal plane base on horizontal plane.

a) circle, rectangle and rectangle b) rectangle, rectangle and circle c) rectangle, circle and rectangle d) circle, triangle and triangle

PART B- CORE COURSES

11. In multiple Bus organisation, the registers are collectively placed and referred as _____

a) Set registers b) Register file c) Register Block d) Map registers

12. The registers, ALU and the interconnection between them are collectively called as _____

a) Process route b) Gatings c) Information path d) Data Path

13. In ---------- protocol the information is directly written into the main memory.

a) Write through b) Write back c) Load Through d) Copy back

14. In memory mapped I/O

a) The I/O devices and memory share the same address space b) The I/O devices have a separate address space c) A part of memory is specifically set aside for the I/O operation d) The memory and I/O devices have an associated address space

15. ---------- is the delay between the time an interrupt request is received and the start of execution of the interrupt service routine.

a) Interrupt delay b) Cycle time c) Interrupt latency d) Switching time

16. ---------- method is used to establish priority by serially connecting all devices that request an interrupt.

a) Vectored interrupt b) Polling c) Daisy Chain d) Priority arbitration

17. Mov al,[bx] Which addressing mode does this instruction use :

a) Register indirect b) Base index c) Base index plus displacement d) Register

18. The context-free languages are closed for:

(i) Intersection (ii) Union

(iii) Complementation (iv) Kleene Star

a) (i) and (iv) b) (i) and (iii) c) (ii) and (iv) d) (ii) and (iii)

19. The regular expression denoting the set of all strings not containing two consecutive 0's is given by

a) $(1+01)^*$ b) $(1+01)^*(\varepsilon+0)$ (a) $(\varepsilon+0)(101)^*(\varepsilon+0)$ (b) $(0+10)^*(\varepsilon+1)$

20. Which of the following languages is regular?

a) $\{ww^R \mid w \in \{0,1\}^+\}$ b) $\{ww^Rx \mid x, w \in \{0,1\}^+\}$

c) $\{wxw^R \mid w, x \in \{0,1\}^+\}$ d) $\{xww^R \mid x, w \in \{0,1\}^+\}$

21. Read the following statements:

1. For every NFA with an arbitrary number of final states, there is an equivalent NFA with only one final state.
2. Regular sets are closed under infinite union
3. Regular sets are closed under infinite intersection
4. Regular sets are closed under substring operation

Which of the following are true?

a) 1 only b) 1,2 only c) 1,2,3 only d) 2,3,4 only

22. Consider the grammar given below:

S-> AB | DA , A-> a | BC | aBCAD | Da | aBD | aCBD | aSBCD

B-> BCD | ABD | CC | b , C-> aBD | a | aBCAD | DaB , D -> a | b

the language generated by the grammar is :

a) Empty b) finite c) Infinite d) Finite but not regular

23. ε-closure is defined as:

a) the set of states being reached through ε-transitions from a starting state.
b) the set of states being reached after ε-transitions from a starting state.
c) the set of states being reached before ε-transitions from a starting state.
d) the set of states being reached without ε-transitions from a starting state.

24. Consider the languages L1 = $\{0^i1^j \mid i != j\}$,L2 = $\{0^i1^j \mid i = j\}$, L3 = $\{0^i1^j \mid i = 2j+1\}$,L4 = $\{0^i1^j \mid i != 2j\}$.

a) Only L2 is context free
b) Only L1 and L2 are context free
c) Only L2 and L3 are context free
d) L1, L2, L3 and L4 are context free

25. To access the services of operating system, the interface is provided by the

a) System calls b) API c) Library d) Assembly instructions

26. Consider the following set of processes, with arrival times and the required CPU-burst times given in milliseconds.

Process	Arrival time	Burst Time
P1	0	4
P2	2	2
P3	3	1

What is the sequence in which the processes are completed? Assume Round Robin Scheduling with a time quantum of 2 milliseconds.

a) P1, P2, P3 b) P2, P1, P3 c) P3, P2, P1 d) P2, P3, P1

27. In order to allow only one process to enter the Critical Section, binary semaphore is initialized to:

a) 0 b) 1 c) 2 d) 3

28. Given page reference string: 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 . If memory with 4 frames and FIFO page replacement is used , find count of page-fault

a) 10 b) 17 c) 14 d) 16

29. The circular wait condition can be prevented by

a) defining a linear ordering of resource types b) using thread c) using pipes d) Banker's algorithm

30. File type can be represented by

a) File extension b) File name c) File identifier d) Root Directory

31. Which of the following page replacement algorithms suffers from Belady's anomaly?

a) FIFO b) LRU c) Optimal d) Both LRU and FIFO

32. While designing a typical database system for a large organization, who is NOT an actor of the scene?

a) Database Administrators b) Database Designers c) Cloud Managers d) End Users

33. SQL query language is

a) Nonprocedural b) Procedural c) Object oriented d) All the above

34. A _____ is a special kind of a stored procedure that executes in response to certain action on the table like insertion, deletion or updation of data.

a) Assertions b) Functions c) Triggers d) Views

35. Which of the following is not Armstrong's Axiom?

a) Transitivity rule b) Augmentation rule c) Reflexivity rule d) None of the above

36. In data file, first record of any of block is called

a) Anchor record b) Dense record c) Non dense record d) None of the above

37. Which one is true about clustered index?

a) Clustered index is not associated with table b) Clustered index is built by default on unique key columns c) Clustered index is NOT built on unique key columns d) None of the above

38. Consider the following transactions:

T1: read (A) ;

read (B) ;

if A = 0 then B : = B + 1 ;

write (B) ;

T2: read (B) ;

read (A) ;

if B = 0 then A : = A + 1 ;

write (A) ;

Assuming data items A and B initialized to zero, 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 is the following is the well-known port number of SMTP?

a) 23 b) 25 c) 21 d) 53

40. Which layer is responsible for process-to-process delivery of the entire message.

a) Physical b) Data link c) Transport (d) Network

41. The message 11001001 is to be transmitted using the CRC polynomial x^3 + 1 to protect it from errors. The message that should be transmitted is:

a) 11001001000 b) 11001001011 c) 11001010 d) 10010010011

42. In _____ CSMA protocol, after the station finds the line idle, it sends or refrains from sending based on the outcome of a random number generator.

a) Non-persistent b) 0-persistent c) 1-persistent d) p-persistent

43. The _____ routing uses the Dijkstra algorithm to build a routing table.

a) Distance vector b) Link state c) Path vector d) None of the above

44. Which of the following is true with respect to TCP

a) Connection-oriented b) Process-to-process c) Transport layer protocol d) All of the mentioned

45. What is the time complexity of insert(index) method in ArrayList

a) O(n) (b) $O(n^2)$ c) O(n logn) d) O(log n)

46. The number of leaf nodes in a complete binary tree of depth d is.....

a) 2^d (b) $2^{d-1}+1$ c) $2^{d+1}+1$ (d) 2^d+1

47. Consider a node X in a Binary Tree. Given that X has two children, let Y be Inorder successor of X. Which of the following is true about Y?

a) Y has no right child b) Y has no left child c) Y has both children d) None of the above

48. Pre-order traversal on a tree is similar to _____ traversal on a graph.

a) Depth first b) Breadth first c) Level order (d) In-order

49. Evaluate the postfix expression **ab+cd / -** where a=5,b= 4, c=9, d=3

a) 23 b) 10 c) 15 (d) 6

50. State True or False.
i) Binary search is used for searching in a sorted array.
ii) The time complexity of binary search is O(log n).

a) True False (b) False True c) True True d) False False

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