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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Sixth Semester B.Tech Degree (S,FE) Examination May 2022 (2015 Scheme)

Course Code: CS352

Course name: COMPREHENSIVE EXAM

Max. Marks: 50 Duration: 1Hour

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. $\lim_{k\to\infty}\left(1+\frac{2}{k}\right)^{k}$ is.....

a) 1 b) 0 c) e^{-2} d) e^{2}

2. The general solution of $y''+y'-6y=0$ is.....

a) $ae^{-2x}+be^{-3x}$ b) $ae^{2x}+be^{3x}$ c) $ae^{2x}+be^{-3x}$ d) $ae^{-2x}+be^{3x}$

3. A block whose mass m = 4kg is fastened to a spring with spring constant k = 64N/m. The block is pulled from its equilibrium position on a frictionless surface and released. The period of the resulting motion is

a) π /4 b) π /2 c) 2π d) π

4. The point, through which the whole weight of the body acts, irrespective of its position, is known as

a) moment of inertia b) centre of gravity c) centre of mass d) centre of percussion

5. The BIS specified dimension of A2 sheet in mm is

a) 841 x 1189 b) 594 x 841 c) 420 x 594 d) 297 x 420

6. Which is the correct statement

a) True length of a line is always greater than its apparent length b) True length of a line can never be less than its apparent length c) True length and apparent lengths are same for lines d) Apparent length is always greater than true length of lines

7. The three pillars for sustainable development are-

a) Man, Money and Machines b) Society, Recycle and Reuse c) Society, Environment and Economy d) Environment, Man and Economy

8. Cradle to Grave -- Assessment means to assess from

a) Material extraction to disposal
b) Material extraction to recycling of the product
c) Material extraction to the factory gate
d) Material extraction and energy consumption and emission impacts.

9. A plan or drawing produced to show the look and function or working of an object before it is made

a) Prototype
b) Analysis
c) Design
d) Architecture

10. A feature or behaviour that we wish the design to have or exhibit

a) Design initiation
b) Design constrain
c) Design means
d) Design objective

PART B- CORE COURSES

11. Number of relations on a set with n elements is

a) 2^{n^2}
b) n^2
c) 2^{2n^2}
d) 2n

12. Let A= {1,2,3,4,5,6}. A relation R in A is defined as, for x,y ϵ A, xRy iff x divides y. Then

a) R is symmetric
b) R is not reflexive
c) R is reflexive and symmetric
d) R is a Partial order

13. Number of arrangements of the letters of 'MATHEMATICS' is

a) 11!
b) 11! / 2!
c) 11! / 2! 2!
d) 11! / 2! 2! 2!

14. Which of the following is a monoid?

a) Set of integers with subtraction.
b) Set of natural numbers with addition
c) Set of rational numbers with addition
d) None of these

15. Which of the following is absorption law??

a) A+A.B = A
b) A+A.B =B
c) A+A.B = A+B
d) $A+A.A^I = A$

16. The logical statement $(P \rightarrow q) \wedge \neg q \rightarrow \neg P$ is known as

a) Law of syllogism
b) Law of Disjunction
c) Modus Ponens
d) Modus Tollens

17. Condition for which a recursive function stops calling itself is

a) Best Case
b) Base Case
c) Worst Case
d) None of the above

18. The postfix form of the expression (1+ 9)*(4*5- 8)*3 / 2 is

a) 19+45*8-*3*2/
b) 19+*45*8-3*2/
c) 1945832/*-**+
d) 19458-**+32/*

19. In a singly linked list with unsorted elements, which of the following operation can be performed in O(1) time?

a) Insertion at the end of the linked list
b) Insertion at the beginning of the linked list
c) Sorting the elements in the linked list
d) None of the above

20. Result of the postfix expression abcde * + * + , where a = 1, b = 2, c = 3, d = 4, and e =5

a) 29
b) 19
c) 47
d) 37

21. Suppose the numbers 18, 10, 20, 7, 15, 4, 8, 20, 19, and 26 are inserted in that order into an initially empty binary search tree. What is the inorder traversal of the resultant tree?

a) 18, 10, 7, 4, 8, 15, 20, 19, 26
b) 4, 8, 7, 15, 10, 19, 26, 20, 18
c) 7, 4, 8, 10, 15, 18, 19, 20, 26
d) 4, 7, 8, 10, 15, 18, 19, 20, 26

22. The maximum number of binary trees that can be formed with three unlabeled nodes is:

a) 3
b) 2
c) 1
d) 5

23. What is the worst-case complexity of linear search?

a) O(n)
b) O(n log n)
c) O(1)
d) O(log n)

24. What is the hash function used in division method? (assume that the indices start from 1)

a) H(x) = k (mod h)
b) H(x) = k (mod h) + 1
c) H(x) = k
d) H(x) = k /n

25. The addressing mode of instruction MOVE 10 [PC], R2

a) Direct
b) Indirect
c) Relative
d) Immediate

26. In assembly language programming minimum number of operands required for an instruction is

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

27. Which signal is used to show complete of memory operation

a) MFC
b) WMFC
c) CFC
d) None of the above

28. Booth's algorithm is used for

a) Signed binary multiplication
b) Signed hexadecimal multiplication
c) Signed binary division
d) Signed octal division

29. An interrupt that can be temporarily ignored is

a) Vectored interrupt
b) Maskable interrupt
c) Non maskable interrupt
d) High priority interrupt

30. DMA transfer is initiated by ----------

a) Processor b) Process being executed c) I/O devices d) OS

31. A tuple corresponds to

a) File b) Attribute c) Record d) Database

32. The execution of a transaction should not be interfered by any other transactions executing concurrently. This property is known as

a) Atomicity b) Isolation c) Durability d) Consistency

33. The relation schema R (A, B, C, D) has the following FDs:
A,B->D, C,B->D, A->C, C->A. The highest normal form satisfied by R is

a) 1 NF b) 2 NF c) 3 NF d) None of these

34. Statement 1: More than one primary index is possible for a file

Statement 2: More than one secondary index is possible for a file

a) Both Statement 1 and Statement 2 are False b) Statement 1 is True but Statement 2 is False c) Statement 1 is False but Statement 2 is True d) Both Statement 1 and Statement 2 are True

35. Number of tuples in a relation is known as

a) Degree b) Entity c) Cardinality d) Cardinality ratio

36. What is the minimum number of states required in a DFA accepting the following language?
L={w | w ε {0,1}*, number of 0's and 1's are divisible by 3 and 5 respectively}

a) 15 b) 10 c) 11 d) 9

37. Context Free Languages are not closed under

a) Reversal b) Complementation c) Concatenation d) Kleene Closure

38. Consider the language L={ww | w ε {0,1}*}. L is

a) Regular b) CFL c) Accepted by Turing machine d) None of these

39. The method used to check whether a given string w is a member of a Context Free Grammar or not is

a) Thomson's construction b) CYK algorithm c) Table filling algorithm d) Church hypothesis

40. Let B be a linear bounded automaton. Then the grammar corresponding to L(B) is

a) Context Sensitive grammar b) Context Free grammar c) Unrestricted grammar d) Regular grammar

41. Consider the language $L=\{0^n1^n \mid n>=1\}$. Which of the following is True?

a) Deterministic PDA exist for L b) NFA exist for L c) The language is regular d) DFA exist for L

42. The family of recursive languages is not closed under

a) Union b) Intersection c) Complementation d) None

43. In which of the following mode, the kernel runs on behalf of the user?

a) User b) Kernel c) Real d) All of the above

44. Where is BIOS stored?

a) SRAM b) DRAM c) Flash memory d) All of the above

45. The number of child processes created while executing three fork() system calls is ---------

a) 8 b) 7 c) 4 d) 3

46. The scheduler that decides which process has to be brought into the ready queue is ----------

a) Long-term scheduler b) Short-term scheduler c) Medium-term scheduler d) Both (a) and (b)

47. Let P1, P2 & P3 be 3 processes with burst time 25, 15 & 5 respectively. What will be the waiting time of P2 if SJF scheduling is used? (assume zero arrival time for processes)

a) 5 b) 15 c) 20 d) 25

48. Which of the following is used for avoiding deadlock?

a) Peterson's solution b) Semaphores c) Resource Allocation Graph d) Mutex Locks

49. The principle of locality of reference is related to ----------

a) Virtual memory b) Main memory c) Paging d) Cache memory

50. The disk scheduling algorithm that services requests while scanning disk head in both directions

a) LOOK b) C-LOOK c) SCAN d) C-SCAN

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