POST GRADUATE COMMON ENTRANCE TEST-2018

DATE and TIME	COURSE	SUBJECT
14-07-2018 2.30 p.m. to 4.30 p.m.	ME/M.Tech/M.Arch/ courses offered by VTU/UVCE/UBDTCE	COMPUTER SCIENCE ENGINEERING

MAXIMUM MARKS	TOTAL DURATION	MAXIMUM TIME FOR ANSWERING
100	150 Minutes	120 Minutes

MENTION YOUR PGCET NO.					QUESTION BOOKLET DETAILS	
					VERSION CODE	SERIAL NUMBER
					A	107205

DOs :

1. Candidate must verify that the PGCET number & Name printed on the OMR Answer Sheet is tallying with the PGCET number and Name printed on the Admission Ticket. Discrepancy if any, report to invigilator.
2. This question booklet is issued to you by the invigilator after the **2nd bell i.e., after 2.25 p.m.**
3. The Version Code of this Question Booklet should be entered on the OMR Answer Sheet and the respective circle should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts :

1. **The timing and marks printed on the OMR answer sheet should not be damaged / mutilated / spoiled.**
2. The **3rd Bell rings at 2.30 p.m., till then;**
   - Do not remove the paper seal / polythene bag present on the right hand side of this question booklet.
   - Do not look inside this question booklet.
   - Do not start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. This question booklet contains 75 (items) questions and each question will have one statement and four answers. (Four different options / responses.)
2. After the **3rd Bell is rung at 2.30 p.m.,** remove the paper seal / polythene bag on the right hand side of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
3. During the subsequent 120 minutes:
   - Read each question (item) carefully.
   - Choose one correct answer from out of the four available responses (options / choices) given under each question / item. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **only one response** for each item.
   - **Completely darken / shade the relevant circle with a BLUE OR BLACK INK BALL POINT PEN against the question number on the OMR answer sheet.**

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHODS
(A) ● (C) (D)	(A) (B) (C) (D) (A) (B) (C) ✓ (A) ● ● (D) ● (B) (C) (D) (A) ● (C) (D)

4. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
5. After the **last Bell is rung at 4.30 p.m.,** stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
6. Handover the **OMR ANSWER SHEET** to the room invigilator as it is.
7. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (Candidate's copy) to you to carry home for self-evaluation.
8. Preserve the replica of the OMR answer sheet for a minimum period of **ONE year.**
9. Only **Non-programmable** calculators are allowed.

Marks Distribution

PART-1 : 50 QUESTIONS CARRY ONE MARK EACH (1 TO 50)
PART-2 : 25 QUESTIONS CARRY TWO MARKS EACH (51 TO 75)

CSE - A

COMPUTER SCIENCE & ENGINEERING

PART – 1

Each question carries one mark. **(50 × 1 = 50)**

1. In how many ways can 5 prizes be distributed among 4 boys when every boy can take one or more prizes ?
   (A) 1024
   (B) 625
   (C) 120
   (D) 600

2. Which of the following is TRUE ?
   (A) Set of all rational negative numbers forms a group under multiplication
   (B) Set of all non-singular matrices forms a group under multiplication
   (C) Set of all matrices forms a group under multiplication
   (D) Both (B) and (C)

3. Two unbiased coins are tossed. What is the probability of getting at most one head ?
   (A) $\frac{1}{2}$
   (B) $\frac{1}{3}$
   (C) $\frac{1}{6}$
   (D) $\frac{3}{4}$

4. Which of the following mentioned standard Probability density functions is applicable to discrete Random Variables ?
   (A) Gaussian Distribution
   (B) Polynomial Distribution
   (C) Poisson Distribution
   (D) Exponential Distribution

5. In a Binomial Distribution, if p, q and n are probability of success, failure and number of trials respectively then variance is given by
   (A) Np
   (B) Npq
   (C) np^2q
   (D) npq^2

6. The time complexity to build a heap with a list of n numbers is
   (A) O(log n)
   (B) O(n)
   (C) O(n logn)
   (D) $O(n^2)$

Space For Rough Work

7. To represent hierarchical relationship between elements, Which data structure is suitable ?

(A) Graph

(B) Tree

(C) List

(D) Stack

8. Which of the following is an external sorting ?

(A) Shell sort

(B) Heap sort

(C) Merge sort

(D) Bubble sort

9. What is the minimum number of stacks of size n required to implement a queue of size n ?

(A) One

(B) Two

(C) Three

(D) Four

10. How many undirected graphs (not necessarily connected) can be constructed out of a given set $V = \{v1, v2, \ldots, vn\}$ of n vertices ?

(A) $n(n-1)/2$

(B) $2n$

(C) $n!$

(D) $2^{n(n-1)/2}$

11. Merge sort algorithm uses ____ design technique.

(A) Greedy

(B) Backtracking

(C) Dynamic Programming

(D) Divide and Conquer

12. A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is known as

(A) Lemma Tree

(B) Red Black Tree

(C) AVL Tree

(D) None

Space For Rough Work

13. Which register is used for the purpose of controlling the status of each interrupt request in parallel priority interrupt ?

(A) Mask

(B) Proc

(C) Mark

(D) None of the these

14. In pipeline architecture, if a unit completes its task before the allotted time period, then

(A) Its time gets reallocated to different task

(B) It will perform other task in the remaining time

(C) It will remain idle for remaining time

(D) None of these

15. The write-through procedure is used

(A) To write onto the memory directly

(B) To write directly on the memory and the cache simultaneously

(C) To write and read onto the memory directly

(D) To write and read from memory simultaneously

16. The addition of 4-bit, two's complement, binary numbers 1101 and 0100 results in

(A) 0001 and an overflow

(B) 1001 and no overflow

(C) 0001 and no overflow

(D) 1001 and an overflow

17. Which of the following DMA transfer modes and interrupt handling mechanics will enable the highest I/O band-width ?

(A) Transparent DMA and polling interrupts

(B) Cycle-stealing and Vectored interrupts

(C) Block transfer and Vectored interrupts

(D) Block transfer and Polling interrupts

18. The circular wait condition can be prevented by

(A) using thread

(B) defining a linear ordering of resource types

(C) using pipes

(D) All of the above

Space For Rough Work

19. A half-adder is also known as

(A) AND circuit

(B) EX-OR circuit

(C) NAND circuit

(D) NOR circuit

20. Which of the following is an application of Finite Automaton ?

(A) Compiler Design

(B) Grammar Parsers

(C) Text Search

(D) All of the above

21. A language is regular if and only if

(A) accepted by DFA

(B) accepted by LBA

(C) accepted by PDA

(D) accepted by Turing machine

22. Regular expressions are

(A) Type 0 language

(B) Type 1 language

(C) Type 2 language

(D) Type 3 language

23. Parsing is also known as

(A) Lexical analysis

(B) Syntax analysis

(C) Semantic analysis

(D) Code generation

24. System calls are usually invoked by using

(A) A privileged instruction

(B) A direct jump

(C) A software interrupt

(D) Polling

25. Which one of the following is the deadlock avoidance algorithm ?

(A) round-robin algorithm

(B) elevator algorithm

(C) karn's algorithm

(D) banker's algorithm

26. Multithreaded programs are

(A) lesser prone to deadlocks

(B) more prone to deadlocks

(C) not at all prone to deadlocks

(D) None of these

Space For Rough Work

27. Which of the following is an RISC architecture ?

(A) 80286

(B) Zilog Z80

(C) MIPS

(D) 80386

28. An assembler is

(A) Programming language dependent

(B) Syntax dependent

(C) Machine dependent

(D) Data dependent

29. The instruction, MOV AX, 0005H belongs to the address mode

(A) Register

(B) Direct

(C) Immediate

(D) Register relative

30. The interrupt for which the processor has highest priority among all the internal interrupts is

(A) keyboard interrupt

(B) TRAP

(C) NMI

(D) INT

31. Third normal form is based on the concept of

(A) Functional dependency

(B) Transitive dependency

(C) Normal dependency

(D) None of these

32. Based on the cardinality ratio and participation _____ associated with a relationship type, choose either the Foreign Key Design, the Cross Referencing Design or Mutual Referencing Design.

(A) Index

(B) Constraints

(C) Rules

(D) Keys

Space For Rough Work

33. Which data improves the performance and accessibility of the database ?

(A) Index

(B) User data

(C) Application metadata

(D) Data dictionary

34. Which one is correct w.r.t. RDBMS ?

(A) primary key $\subseteq$ super key $\subseteq$ candidate key

(B) primary key $\subseteq$ candidate key $\subseteq$ super key

(C) super key $\subseteq$ candidate key $\subseteq$ primary key

(D) super key $\subseteq$ primary key $\subseteq$ candidate key

35. A bridge has access to _____ address in the same network.

(A) Physical

(B) Network

(C) Datalink

(D) Application

36. Infrared signals can be used for short range communication in a closed area using _____ propagation.

(A) Ground

(B) Sky

(C) Line of sight

(D) Space

37. The minimum frame length for 10 Mbps Ethernet is _____ bytes and maximum is _____ bytes.

(A) 64 & 128

(B) 128 & 1518

(C) 1518 & 3036

(D) 64 & 1518

38. Which of the following is used in the options field of IPv4 ?

(A) Strict source routing

(B) Time stamp

(C) Loose source routing

(D) All of the above

Space For Rough Work

39. Which of the following OSI layers are host-to-host layers ?

(A) Transport, Session, Presentation

(B) Network, Transport, Session

(C) Data-link, Network, Transport

(D) Physical, Data-link, Network,

40. In IPv4 header, the _____ field is needed to allow the destination host to determine which datagram a newly arrived fragment belongs to.

(A) Identification

(B) Fragment offset

(C) Subnet

(D) Time-to-live

41. Which of the following addresses is used to deliver a message to the correct application program running on a host ?

(A) IP

(B) Port

(C) MAC

(D) Ethernet

42. _____ provides an option for entering SQL queries at execution time, rather than at the development stage.

(A) PL/SQL

(B) SQL*Plus

(C) SQL

(D) Dynamic SQL

43. If database modifications occur while the transaction is still active, the transaction is said to use the _____technique.

(A) Deferred-modification

(B) Late-modification

(C) Immediate-modification

(D) Undo

44. A grammar for a programming language is a formal description of

(A) Syntax

(B) Semantics

(C) Structure

(D) Library

Space For Rough Work

45. A finite automata recognizes

(A) Any Language

(B) Context Sensitive Language

(C) Context Free Language

(D) Regular Language

46. A web cookie is

(A) sent from user and stored in the server while a user is browsing a website

(B) sent from a website and stored in user's web browser while a user is browsing a website

(C) sent from root server to all servers

(D) None of these

47. DTD definition is used along with XML to specify

(A) The data type of the XML document

(B) The presentation of the XML document

(C) The structure of the XML document

(D) The link with other documents

48. MSXML is

(A) a Microsoft language

(B) XML parser that ships with IE

(C) a subset of XML

(D) None of these

49. AJAX stands for

(A) asynchronous javascript and xml

(B) advanced JSP and xml

(C) asynchronous JSP and xml

(D) advanced javascript and xml

50. Which one is a collection of templates and rules ?

(A) XML

(B) CSS

(C) XSL

(D) DHTML

Space For Rough Work

PART – 2

Each question carries two marks. **(25 × 2 = 50)**

51. There are (n + 1) white and (n + 1) black balls each set numbered 1 to n + 1. The number of ways in which the balls can be arranged in a row so that adjacent balls are of different colours, is

(A) (2n + 2)!

(B) (2n + 2)! * 2

(C) (n + 1)! * 2

(D) 2 * [(n + 1)!] ^{2}

52. Let A and B be two events such that P(A) = $\frac{1}{5}$ While P(A or B) = $\frac{1}{2}$. Let P(B) = P. For what values of P are A and B independent ?

(A) $\frac{1}{10}$ and $\frac{3}{10}$

(B) $\frac{3}{10}$ and $\frac{4}{5}$

(C) $\frac{3}{8}$

(D) $\frac{3}{10}$

53. In the group G = {2, 4, 6, 8} under multiplication modulo 10, the identity element is

(A) 6

(B) 8

(C) 4

(D) 2

54. The reverse polish notation equivalent to the infix expression: ((A + B) * C + D)/(E + F + G))

(A) A B + C * D + EF + G + /

(B) A B + C D * + E F + G + /

(C) A B + C * D + E + F G + /

(D) A B + C * D + E F G + +/

55. Consider the fractional knapsack instance n = 4, profit: (p1, p2, p3, p4) = (10, 10, 12, 18), weight: (w1, w2, w3, w4) = (2, 4,6, 9) and M = 15. The maximum profit is given by

(A) 40

(B) 38

(C) 32

(D) 30

56. For any B-tree of minimum degree t ≥ 2, every node other than the root must have atleast _____ keys and every node can have at most _____ keys.

(A) t – 1, 2t + 1

(B) t + 1, 2t + 1

(C) t – 1, 2t – 1

(D) t + 1, 2t – 1

Space For Rough Work

57. Which one of the following is true with regard to a CPU having a single interrupt request line and single interrupt grant line ?

I. Neither vectored nor multiple interrupting devices is possible.

II. Vectored interrupts is not possible but multiple interrupting devices is possible.

III. Vectored interrupts is possible and multiple interrupting devices is not possible.

IV. Both vectored and multiple interrupting devices are possible.

(A) III

(B) I & IV

(C) II & III

(D) III & IV

58. Which of the following statements are true ?

I. A circuit that adds two bits, producing a sum bit and a carry bit is called half adder.

II. A circuit that adds two bits, producing a sum bit and a carry bit is called full adder.

III. A circuit that adds two bits and a carry bit producing a sum bit and a carry bit is called full adder.

IV. A device that accepts the value of a Boolean variable as input and produces its complement is called an inverter.

(A) I & II

(B) II & III

(C) I, II & III

(D) I, III & IV

59. The dual of a Boolean expression is obtained by interchanging (A) (B) (C) (D)

(A) Boolean sums and Boolean products and interchanging 0's & 1's

(B) Boolean sums and Boolean products or interchanging 0's and 1's

(C) Interchanging 0's and 1's

(D) Boolean sums and Boolean products

60. A grammar G is LL(1) if and only if the following conditions hold for two distinct productions $A \rightarrow \alpha \mid \beta$

I. First $(\alpha) \cap$ First $(\beta)! = \{a\}$ where a is some terminal symbol of the grammar.

II. First $(\alpha) \cap$ First $(\beta)! = \lambda$

III. First $(\alpha) \cap$ Follow $(A) = \phi$ if $\lambda \in$ First (β)

(A) I and II

(B) I and III

(C) II and III

(D) I, II and III

Space For Rough Work

61. The regular grammar for the language $L = \{w | n_a(w)$ and $n_b(w)$ are both even, $w \in \{a, b\}^*\}$ is given by : (Assume, p, q, r and s are states)

(A) $p \rightarrow aq \mid br \mid \lambda$, $q \rightarrow bs \mid ap$, $r \rightarrow as \mid bp$, $s \rightarrow ar \mid bq$, p and s are initial and final states

(B) $p \rightarrow aq \mid br$, $q \rightarrow bs \mid ap$, $r \rightarrow as \mid bp$, $s \rightarrow ar \mid bq$, p and s are initial and final states.

(C) $p \rightarrow aq \mid br \mid \lambda$, $q \rightarrow bs \mid ap$, $r \rightarrow as \mid bp$, $s \rightarrow ar \mid bq$, p is both initial and final states

(D) $p \rightarrow aq \mid br$, $q \rightarrow bs \mid ap$, $r \rightarrow as \mid bp$, $s \rightarrow ar \mid bq$, p is both initial and final states

62. Given the following two languages :

$L1 = \{a^n b^n \mid n > 1\} \cup \{a\}$

$L2 = \{w\ C\ wR \mid w \in \{a, b\}^*\}$, Which statement is correct ?

(A) Both L1 and L2 are not Deterministic

(B) L1 is not deterministic and L2 is Deterministic

(C) L1 is deterministic and L2 is not Deterministic

(D) Both L1 and L2 are deterministic

63. Consider a program that consists of 8 pages (from 0 to 7) and we have 4 page frames in the physical memory for the pages. The page reference string is : 1 2 3 2 5 6 3 4 6 3 7 3 1 5 3 6 3 4 2 4 3 4 5 1

The number of page faults in LRU and optimal page replacement algorithms are respectively (without including initial page faults to fill available page frames with pages) :

(A) 9 and 6

(B) 10 and 7

(C) 9 and 7

(D) 10 and 6

64. Assuming that the disk head is located initially at 32, find the number of disk moves required with FCFS if the disk queue of I/O block requests are 98, 37, 14, 124, 65, 67 :

(A) 310

(B) 320

(C) 324

(D) 321

65. Consider the following processes with time slice of 4 milliseconds (I/O requests are ignored) : Process A, B, C, D; Arrival time 0, 1, 2, 3; CPU cycle 8, 4, 9, 5 respectively,

The average turnaround time of these processes will be

(A) 19.25 milliseconds

(B) 18.25 milliseconds

(C) 19.5 milliseconds

(D) 18.5 milliseconds

Space For Rough Work

66. Suppose S and Q are two semaphores initialized to 1. P1 and P2 are two processes which are sharing resources.

P1 has statements;	P2 has statements
wait(S);	wait(Q);
wait(Q);	wait(S);
critical section 1;	critical section 2;
signal(S);	signal(Q);
signal(Q);	signal(S);

Their execution may sometimes lead to an undesirable situation called

(A) Starvation

(B) Race condition

(C) Deadlock

(D) None of the above

67. Which of the following statements is false ?

(A) Any relation with two attributes is in BCNF.

(B) A relation in which every key has only one attribute is in 2NF.

(C) A prime attribute can be transitively dependent on a key in 3NF relation.

(D) A prime attribute can be transitively dependent on a key in BCNF relation.

68. Let R = {A, B, C, D, E, F} be a relation schema with the following dependencies C → F, E → A, EC → D, A → B. Which of the following is a key for R ?

(A) CD

(B) EC

(C) AE

(D) AC

69. The employee information of an Organization is stored in the relation :

Employee (name, sex, salary, deptname)

Consider the following SQL query

"Select deptname from Employee Where sex = 'M' group by deptname having avg(salary) > {select avg (salary) from Employee}"

Output of the given query corresponds to

(A) Average salary of male employees in a department is more than average salary of the organization.

(B) Average salary of employee equal to average salary of the organization.

(C) Average salary of employee more than average salary of the organization.

(D) Average salary less than average salary of the organization.

Space For Rough Work

70. A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle ?

(A) 1024

(B) 2018

(C) 4096

(D) 8192

71. Four bits are used for packed sequence numbering in a sliding window protocol used in a computer network. What is the maximum window size ?

(A) 4

(B) 9

(C) 15

(D) 16

72. Consider the following message M = 1010001101. The cyclic redundancy check (CRC) for this message using the divisor polynomial $x^5 + x^4 + x^2 + 1$ is:

(A) 01110

(B) 01011

(C) 10110

(D) 10101

73. A TCP message consisting of 2100 bytes is passed to IP for delivery across two networks. The first network can carry a maximum payload of 1200 bytes per frame and the second network can carry a maximum payload of 400 bytes per frame, excluding network overhead. Assume that IP overhead per packet is 20 bytes. What is the total IP overhead in the second network for this transmission ?

(A) 40 bytes

(B) 80 bytes

(C) 120 bytes

(D) 160 bytes

74. Common gateway interface is used to

(A) generate executable files from web content by web server

(B) generate web pages

(C) stream videos

(D) none of these

75. Which of these is a proper JSON array ?

(A) {"letters": ["a", "b", "c";]}

(B) {'letters': {"a", "b", "c"}}

(C) {"letters": [a, b, c]}

(D) {"letters": ["a", "b", "c"]}

Space For Rough Work

Space For Rough Work