POST GRADUATE COMMON ENTRANCE TEST – 2011

DATE and TIME	COURSE	SUBJECT
06-08-2011 10:30 am to 12:30 pm	**ME / M. Tech / M. Arch / MBA (Infrastructure Management) 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_4	00005224

DOs

1. Check whether the PGCET No. has been entered and shaded in the respective circles on the OMR answer sheet.
2. This question booklet is issued to you by the invigilator after the **2nd Bell, i.e. after 10:25 am.**
3. The serial number of this question booklet should be entered on the OMR answer sheet.
4. The version code of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
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 10:30 am, till then;**
   - Do not remove the seals of this question booklet.
   - Do not look inside this question booklet.
   - Do not start marking 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 10:30 am, remove the seals 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 marking 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 question / item.
   - Completely **darken / shade** the relevant circle with a **blue or black ink ballpoint pen against the question number on the OMR answer sheet.**
4. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
5. Use the space provided at the bottom on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
6. After the **last bell is rung at 12:30 pm**, stop marking on the OMR answer sheet and affix your **left hand thumb impression** on the OMR answer sheet as per the instructions.
7. Hand over the **OMR answer sheet** to the room invigilator as it is.
8. 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.
9. Preserve the replica of the OMR answer sheet for a minimum period of ONE year.
10. Only **Non-programmable** calculators are allowed.

Marks Distribution

PART I : 50 Questions carry one mark each (1 to 50)
PART II : 25 Questions carry two marks each (51 to 75)

SEAL

SEAL

PART – I

Each question carries *one* mark. $50 \times 1 = 50$

1. The production line of a chip manufacturing unit wants to simulate the probability of a chip being manufactured defective. Common sense says that the probability of a chip being defective does not depend on whether or not the previous chip was defective. Hence, the probability distribution, appropriate for the situation, is

   (A) uniform (B) normal (C) binomial (D) triangular.

2. The data structure useful for the breadth first search of a graph is

   (A) stack (B) queue (C) linked list (D) dequeue.

3. Merge sort uses

   (A) greedy methodology (B) divide and conquer methodology

   (C) dynamic methodology (D) heuristics with back tracking.

4. A municipality stored details about every house in its perview as a 'structure', each containing a large number of details. These are to be sorted. The best approach is

   (A) sort them directly

   (B) store them in an array and sort the array

   (C) store pointers to them in an array and sort the array

   (D) store them in a linked list and sort the linked list.

5. The height of a binary tree is defined as the maximum number of edges in any path from the root to the leaf. The maximum number of nodes in any binary tree of height h is

   (A) 2^h (B) $2^{h-1} - 1$

   (C) 2^{h+1} (D) $2^{h+1} - 1$.

6. The principle of cache memory is primarily based on

   (A) the principle of locality of reference

   (B) the heuristic 90 – 10 rule

   (C) the fact that the entire program is not required at once

   (D) the faster memories also tend to be costlier.

SPACE FOR ROUGH WORK

7. The number of data pulses required to shift one byte of data from the input to the output of a 4 bit shift register is

(A) 9 (B) 12

(C) 16 (D) 32.

8. Any position independent code is best written using which of the following addressing modes ?

(A) Absolute (B) Direct (C) Indirect (D) Relative.

9. Two finite state machines are said to be equivalent only if they

(A) have the same number of states

(B) have the same number of edges

(C) have the same number of states and also the same number of edges

(D) recognise the same set of tokens.

10. Which statement most closely describes the regular expression $01 * 0$?

(A) It represents a finite set of finite strings

(B) It represents an infinite set of finite strings

(C) It represents a finite set of infinite strings

(D) It represents an infinite set of infinite strings.

11. All compilers are designed to be

(A) recursive (B) serially usable

(C) self correcting (D) re-entrant.

12. Generation of intermediate code based on an abstract machine model is useful in compilers because

(A) it makes the implementation of lexical analysis and syntax analysis easier

(B) syntax directed translations can be written for intermediate code generation

(C) it enhances the portability of the front end of the compiler

(D) it is not possible to directly generate code for real machines.

SPACE FOR ROUGH WORK

13. Recursive descent parsing is an example of

(A) top down parsing (B) bottom up parsing

(C) predictive parsing (D) heuristic parsing.

14. In an absolute loading scheme, the assembler, in addition to its normal functions, should also perform

(A) allocation (B) reallocation

(C) linking (D) loading.

15. In a time sharing system, a process which is currently running, completed its allocated time slot. It now enters the

(A) suspended state (B) blocked state

(C) ready state (D) terminated state.

16. Relations produced from an E-R model will always be in

(A) 1 NF (B) 2 NF (C) 3 NF (D) 5 NF.

17. "A driver's salary may not exceed Rs. 25,000 p.m." This is a / an

(A) integrity constraint (B) referential constraint

(C) feasibility constraint (D) logical constraint.

18. If a relation is in BCNF, then it is also in

(A) 1 NF (B) 2 NF (C) 3 NF (D) 4 NF.

19. Given the relational functional dependencies

$x \rightarrow w$; $x \rightarrow y$; $y \rightarrow z$ and $z \rightarrow pq$

which of the following is NOT VALID ?

(A) $x \rightarrow z$ (B) $x \rightarrow wy$ (C) $y \rightarrow pq$ (D) $w \rightarrow z$.

20. Which of the following is an example of multilevel indexing ?

(A) *A*-tree (B) *B*-tree

(C) Dictionary (D) Network.

SPACE FOR ROUGH WORK

21. The main reason for changing IP addresses from IPv4 to IPv6 is

(A) better technology

(B) faster transfer rate

(C) lesser number of collisions

(D) IPv6 provides more addresses than IPv4.

22. When secure data is to be transmitted over a network, encryption and decryption are undertaken by the

(A) physical layer (B) transport layer

(C) presentation layer (D) session layer.

23 Attributes in XML indicate

(A) a way of attaching properties to elements

(B) the elements

(C) child nodes

(D) documents.

24. The software that establishes a standard way of information exchange between web servers and browsers is called

(A) the HTTP (B) CGI

(C) browsing agent (D) Translator.

25. Which of the following is NOT a client-server application ?

(A) Internet chat (B) Web browsing

(C) Face book (D) Ping.

26. $(P \vee Q) \wedge (P \rightarrow R) \wedge (Q \rightarrow R)$ is equivalent to

(A) P (B) Q

(C) R (D) True $\equiv T$.

27. A fair coin is tossed 3 times in succession. If the first toss produced a head, then the probability of getting exactly two heads in 3 tosses (including the first toss) is

(A) $\frac{1}{8}$ (B) $\frac{3}{8}$ (C) $\frac{1}{2}$ (D) $\frac{3}{4}$.

SPACE FOR ROUGH WORK

28. The probability of two sisters sharing the same birth-month is

(A) $\frac{1}{144}$ (B) $\frac{1}{24}$ (C) $\frac{1}{12}$ (D) $\frac{1}{6}$.

29. $A \cup B$ and $A \cap B$ are equal only if

(A) A is an empty set (B) B is an empty set

(C) both A and B are empty sets (D) both A and B are singleton sets.

30. There are four bus lines between A and B and three between B and C. The number of ways a person can travel by bus from A to C through B is

(A) 10 (B) 12 (C) 14 (D) 24.

31. Which of the following is *not true* about recursion when compared to iteration ?

(A) Recursion executes faster

(B) Recursion allows writing of more compact programs

(C) Recursion uses more memory

(D) Tracing a recursive execution is more difficult.

32. The best method to rearrange books in a library shelf at the end of the day is

(A) insertion sort (B) radix sort

(C) merge sort (D) heap sort.

33. The CPU is expected to handle the interrupt (by executing the ISR)

(A) as and when the interrupt is raised

(B) at pre-fixed time intervals

(C) at the end of the current fetch cycle

(D) at the end of the current execution cycle.

34. $(1217)_8$ is equivalent to

(A) $(1217)_{16}$ (B) $(2297)_{10}$

(C) $(028\,F)_{16}$ (D) $(0B17)_{16}$.

35. How many 32×1 RAM chips are needed to provide a memory capacity of 256 kilo bytes ?

(A) 128 (B) 64 (C) 32 (D) 8.

SPACE FOR ROUGH WORK

36. Which of the following statements is *wrong* ?

(A) Any regular language has an equivalent CFG

(B) Some non-regular languages cannot be generated by any CFG

(C) Intersection of a context free language and a regular language is always context free

(D) All languages can be generated by CFGs.

37. The regular expression ($a|b$) ($a|b$) denotes the set

(A) { a, b }
(B) { a, b, ba, bb }
(C) { a, b, ab, aa }
(D) { aa, ab, ba, bb }

38. P, Q, R are three languages. $PQ = R$ and P and R are regular. This implies

(A) Q has to be regular
(B) Q cannot be regular
(C) Q need not be regular
(D) Q cannot be a CFL.

39. If the access time of a symbol table can be made logarithmic, it greatly reduces the search time. This can be implemented by

(A) a linear list
(B) a search tree
(C) hashing mechanism
(D) self-organisation chart.

40. In a syntax directed translation scheme, the value of an attribute of a node is a function of the attributes of its children. Such an attribute is called a / an

(A) synthesised attribute
(B) canonical attribute
(C) inherited attribute
(D) functional attribute.

41. When there is a large variation in the size of incoming jobs, the best method of memory allocation is

(A) first fit (B) best fit (C) worst fit (D) random.

42. In round-robin CPU scheduling, as the time quantum increases, the average turn around time

(A) decreases
(B) increases
(C) remains almost same
(D) varies erratically.

SPACE FOR ROUGH WORK

43. A dirty bit points to a

(A) corrupted page

(B) wrong page in the memory

(C) the page that has never been accessed

(D) the page whose data is to be updated because of new computations.

44. Which of the following page replacement policies may lead to Belady's anomaly ?

(A) FIFO (B) LRU

(C) MRU (D) Replacement of least active page.

45. Resource allocation graphs are useful in

(A) resource management (B) accounting systems

(C) system auditing (D) deadlock avoidance.

46. Which normal form is found adequate in most relational operations ?

(A) 3 NF (B) 4 NF (C) 5 NF (D) 2 NF.

47. The network topology with the highest reliability is

(A) bus (B) star (C) ring (D) mesh.

48. Start and stop bits are used in serial communication for

(A) error detection (B) error correction

(C) security (D) synchronisation.

49. A sliding window protocol is of the size ($n - 1$). How many maximum packets can be sent without acknowledgement ?

(A) 0 (B) ($n - 1$) (C) n (D) ($n + 1$).

50. The count to infinity problem is associated with

(A) Link State Protocol

(B) Distance Vector Routing Protocol

(C) DNS, while resolving host name

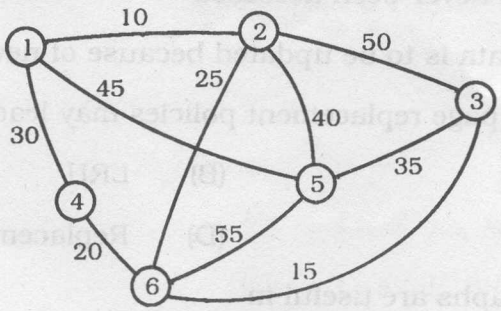
(D) TCP for congestion control.

SPACE FOR ROUGH WORK

PART – II

Each question carries *two* marks. $25 \times 2 = 50$

51. The following graph is reduced to its minimum spanning tree using prim's method. Indicate the sequence in which the nodes get included.



(A) 1, 2, 5, 6, 4, 3 (B) 1, 2, 6, 4, 5, 3

(C) 1, 2, 3, 6, 4, 5 (D) 1, 2, 6, 3, 4, 5.

52. Given the set of keys (40, 80, 35, 90, 45, 50, 70), which of the following represents a heap ? (Each pair of parentheses indicate nodes at one level, left child first)

(A) ((90) (40 – 80) ((35 – 70) – (45 – 50)))

(B) ((80) (90 – 70) ((40 – 45) (35 – 50)))

(C) ((90) (80 – 70) ((40 – 45) (35 – 50)))

(D) ((70) (80 – 90) ((50 – 45) (40 – 35))).

53. Which of the following respectively represent commutative law, associative law and distributive law ?

I) $A . (B . C) = (A . B) . C$

II) $A . (B + C) = A . B + A . C$

III) $A + B = B + A.$

(A) I, II, III (B) III, I, II (C) III, II, I (D) I, III, II.

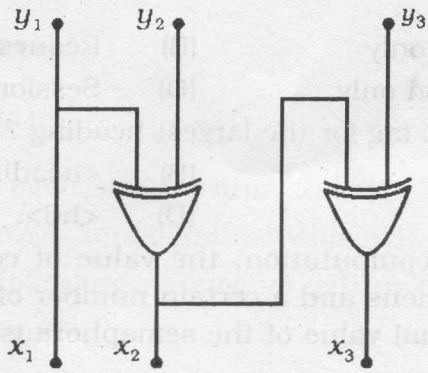
SPACE FOR ROUGH WORK

54. Match the implementations of **Table X** with the addressing modes of **Table Y** :

	X	Y
a)	Array implementation	I) Indirect addressing
b)	Passing array as a parameter	II) Indexed addressing
c)	Writing relocatable code	III) Base register addressing

	a	*b*	*c*
(A)	III	I	II
(B)	II	I	III
(C)	III	II	I
(D)	II	III	I.

55. Look at the logic circuit below :



It converts a binary code y_1 , y_2 , y_3 into

(A) Excess 3 code (B) Gray code

(C) BCD code (D) Hamming code.

56. Match **List-X** with **List-Y** :

	X	Y
a)	Natural Join	I) *B*-tree
b)	Non-procedural Query Language	II) Relational algebraic operation
c)	Secondary Index	III) Domain calculus.

	a	*b*	*c*
(A)	III	I	II
(B)	II	I	III
(C)	I	III	II
(D)	II	III	I

SPACE FOR ROUGH WORK

57. Which of the following statements is *false* ?

(A) Packet switching leads to better utilisation of bandwidth than circuit switching

(B) Packet switching results in less variation in delay than circuit switching

(C) Packet switching needs more per packet processing than circuit switching

(D) Packet switching results in more number of packet losses.

58. The basic principle behind timing attacks on networks is

(A) to guess from the time of transmission

(B) to guess from the time taken for the actual transmission

(C) to guess from the timing difference between expected transmissions

(D) to guess from the time taken to decrypt the message.

59. Which of the following objects can be used in expressions and scriplets in JSP without explicily declaring them ?

(A) Session and request only (B) Request and response only

(C) Response and session only (D) Session, request and response.

60. What is the correct HTML tag for the largest heading ?

(A) <head) = large (B) <heading> = large

(C) <h1> (D) <h6>.

61. At a particular time of computation, the value of counting semaphore is 7. Then afterwards, 20 – *P* operations and a certain number of *V* operations are completed on this semaphore. If the final value of the semaphore is 5, the number of *V* operations was

(A) 13 (B) 15 (C) 18 (D) 22.

62. In a paged memory, the page hit ratio is 0·65. Time required to access a page from secondary memory is 100 ns and from the main memory is 10 ns. The average time required to access a page is

(A) 78·5 ns (B) 68·5 ns (C) 68·0 ns (D) 41·5 ns.

63. Consider the arrival time of 4 processes, as also their CPU demand and priority.

	Arrival time **(ns)**	***CPU time*** **(ns)**	***Priority***
P_1	0	8	4
P_2	2	5	2
P_3	5	15	3
P_4	8	12	1

Assuming their scheduling as SJF (with pre-emption), what is the average waiting time of the system ?

(A) 5 (B) 6·25 (C) 7·25 (D) 10.

SPACE FOR ROUGH WORK

64. The following functional dependencies hold good for the relations $R(A, B, C)$ and $S(B, D, E)$

$B \rightarrow A$; $A \rightarrow C$

The relations R and S contain 200 and 100 tuples respectively. What is the maximum number of tuples possible in the natural join $R \bowtie S$?

(A) 100 (B) 200 (C) 300 (D) 20000.

65. Assume the following relational schema :

Suppliers (sid ; sname ; city ; street)

Parts (pid ; pname ; pcolor)

Catalog (sid ; pid ; cost).

Assume each supplier and each street within the city is unique and (sname, city) forms a candidate key. No other functional dependencies, except those implied in the schema exist. Which of the following statements is true ?

(A) The schema is not in 2 NF

(B) The schema is in 2 NF, but not in 3 NF

(C) The schema is in 3 NF, but not in BCNF

(D) The schema is in BCNF.

66. A bus arrives every 20 minutes to a bus stop, beginning at 6·40 AM and continuing till 8·40 AM. A passenger, not knowing the schedule, randomly arrives between 7 AM and 7·30 AM. What is the probability that he waits for more than 5 minutes for the bus ?

(A) $\frac{1}{6}$ (B) $\frac{1}{4}$ (C) $\frac{3}{4}$ (D) $\frac{5}{6}$.

67. The proposition $p \wedge (\sim p \vee q)$ is

(A) a tautology (B) a contradiction

(C) logically equivalent to $p \wedge q$ (D) logically equivalent to q.

SPACE FOR ROUGH WORK

68. The English sentence 'some cats are black, but all buffalos are black', when translated to predicate logic, appears as

[Note : $\exists$ = some, $\forall$ = all, C = cat, B_f = Buffalo, B = Black]

(A) $\exists x(c(x) \wedge B(x)) \wedge \forall x(B_f(x) \rightarrow B(x))$

(B) $\exists x(c(x) \wedge B(x)) \wedge \forall x(B_f(x) \wedge B(x))$

(C) $\exists x(c(x) \rightarrow B(x)) \wedge \forall x(B_f(x) \wedge B(x))$

(D) $\exists x(c(x) \rightarrow B(x)) \wedge \forall x(B_f(x) \rightarrow B(x))$.

69. Match the methodology of **List-A** with the application of **List-B** :

	List-A		***List-B***
a)	Greedy	I)	connected components
b)	DFS	II)	quick sort
c)	Dynamic programming	III)	min-weight spanning tree
d)	Divide and conquer	IV)	all pairs of shortest paths

	a	***b***	***c***	***d***
(A)	III	I	IV	II
(B)	IV	III	II	I
(C)	III	IV	I	II
(D)	III	I	IV	II

70. Given two problems X and Y, Y is NP complete and X reduces to Y in polynomial time. Which of the following is a valid statement ?

(A) X is NP hard

(B) X is NP complete

(C) X is an NP, but not necessarily NP complete

(D) If X can be solved in polynomial time, so also can Y.

SPACE FOR ROUGH WORK

71. Look at the following grammar :

$S \rightarrow aB \mid bA$

$A \rightarrow b \mid aS \mid bAA$

$B \rightarrow b \mid bS \mid aBB$

It generates strings of terminals that have

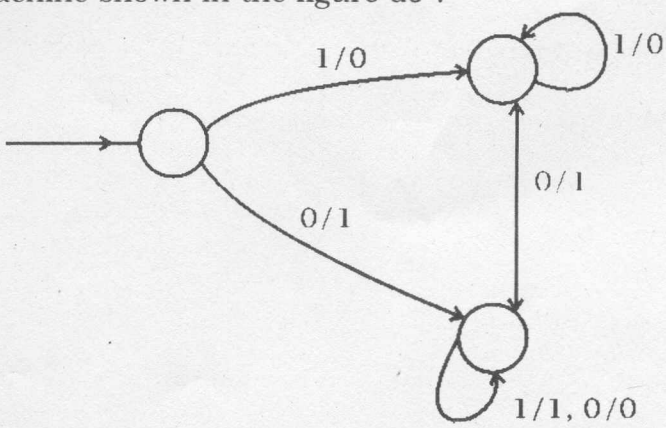
(A) equal number of a's and b's

(B) odd number of a's and odd number of b's

(C) even number of a's and even number of b's

(D) odd number of a's and even number of b's.

72. What does the machine shown in the figure do ?



(A) Complements a given bit pattern

(B) Finds 2's complement of a given pattern

(C) Increments the given pattern by 1

(D) Changes the sign bit.

73. The grammar $S \rightarrow aSa \mid bS \mid c$ is

(A) $LL(1)$ but not $LR(1)$ (B) $LR(1)$ but not $LL(1)$

(C) Both $LL(1)$ and $LR(1)$ (D) neither $LL(1)$ nor $LR(1)$.

74. A hash table contains 10 buckets and uses linear probing to avoid collisions. The key values are integers and hash function used is key mod 10. If the values come as 43, 165, 62, 123 and 142, in what location is 142 inserted ?

(A) 2 (B) 3 (C) 4 (D) 6.

75. A linker needs 4 modules of lengths 200, 800, 600 and 500 words. If they are loaded in that order, what are the relocation constants ?

(A) 0, 200, 500, 800 (B) 0, 200, 1000, 1600

(C) 200, 500, 600, 800 (D) 200, 700, 1300, 2100.

SPACE FOR ROUGH WORK