

(3 Hours)

[Total Marks : 100

25th April, 2012

- N.B. :** (1) All questions are compulsory.
(2) Each question carries one (01) mark.

Section I

- When IP layer of receiving host receives the datagram, _____
 - delivery is complete.
 - A transport layer protocol takes over.
 - A header is added
 - b and c.
- To prevent silly window syndrome created by receiver that processes data at a very slow rate, _____ can be used.
 - Clark's solution
 - Nagle's algorithm
 - delayed acknowledgement
 - a or c
- Which type of BGP message is sent by system to notify another router of the sender's existence?
 - Open
 - Update
 - Keepalive
 - Notification
- SNMP uses _____ in its management tasks.
 - SMI
 - MBI
 - SMTP
 - a and b
- What is the length of data field given an HLEN value of 12 and total length value of 40000?

IP	0
PI	1
P2	2

 - 39988
 - 40012
 - 40048
 - 39952
- Time complexity of MergeSort is _____
 - $O(\log n)$
 - $O(\log \log n)$
 - $O(n \log n)$
 - None of the above.
- Which one of the following is TRUE.
 - All NP Hard problems are NP complete.
 - All NP complete problems are NP Hard.
 - Some NP complete problems are NP Hard.
 - None of these.
- Optimal substructure property is exploited by
 - Dynamic Programming
 - Greedy Method
 - Both a and b
 - None of these.

9. Kruskal,s algorithm is

- a. Asymptotically loose b. Asymptotically tight c. Same as Big O d. none of these

10. Fence register is used for

- a) CPU protection
b) Memory protection
c) File protection
d) All of the above

11. If there are 32 segments, each of size 1 K byte, then the logical address should have

- a) 13 bits
b) 14 bits
c) 15 bits
d) 16 bits

12. At a particular time of computation, the value of counting semaphore is 7. Then 20 P operations and 'x' V operations were completed on this semaphore. If the final value of semaphore is 5, x will be

- a) 22
b) 18
c) 15
d) 13

13. Let the time taken to switch between user and kernel modes of execution be t_1 while time taken to switch between two processes be t_2 . Which of the following is true?

- a) $t_1 > t_2$
b) $t_1 = t_2$
c) $t_1 < t_2$
d) nothing can be said about the relation between t_1 and t_2

14. Consider the following table of arrival time and burst time for three processes

Process	Arrival time	Burst time
P0	0	9
P1	1	4
P2	2	9

The preemptive SJF algorithm is used. What is the average waiting time for three processes.

- a) 5.0
b) 4.33
c) 6.33
d) 7.33

15. Which of the following best describes the difference between paging and segmentation?

- a) Paging breaks a process' virtual memory into physical units of the same size, whereas segmentation breaks a process' virtual memory into logical units that are typically of different sizes.
b) Paging suffers from external fragmentation, whereas segmentation suffers from internal fragmentation.
c) Paging requires page tables for address translation, whereas segmentation does not require segment tables for address translation.
d) Paging requires one page table per process, whereas segmentation requires only one global segment table for the entire system.
e) Page tables are typically very small, whereas segment tables are always very large.

16. Which of the following statements about fixed-length and variable-length instruction set architectures (ISAs) is (are) true?

- I. Variable-length ISAs allow for a smaller code size over fixed-length ISAs.
- II. Fixed-length ISAs simplify instruction fetch and decode over variable-length ISAs.
- III. Variable-length ISAs require more registers than fixed-length ISAs.

a) I only b) II only c) I and II only d) II and III only e) I, II, and III

17. Which of the following statements about caches is (are) true?

- I. A direct-mapped cache can have a lower miss rate than an associative cache of the same size (number of blocks).
- II. Programs with high spatial locality have a low cache miss rate primarily because the exact same addresses are re-referenced.
- III. Programs with high temporal locality have a low cache miss rate primarily because the exact same addresses are re-referenced.

a) I only b) II only c) III only d) I and II e) I and III

18. Name the technique in which multiple instructions are overlapped in execution.

- a) Pipelining b) Superscalar c) Pipeline with superscalar d) Pipeline without superscalar

19. What is the physical address if the base address is 1000 and the displacement is 5.

- a) 5000 b) 1005 c) 995 d) 200

20. A Use case represents

- a) System Boundry b) Major system functionality c) A role d) Entity relationship

21. In a building elevator system there are multiple elevators to be managed .

Algorithm to decide which elevator to be sent to a floor when an elevator call button is pressed from a floor, is build into

- a) Elevator entity class b) Elevator Boundry class c) Elevator controller class d) Elevator Interface class

22. State if this statement related to Class design is true or false

“Users of a class must be dependent on its public interface and a class should be dependent on its users.”

- a) TRUE b) FALSE

23. “ compartmentalizing the elements of an abstraction that constitute its structure and behavior” is

- a) Abstraction b) Encapsulation c) Polymorphism d) Modularity

24. State of an object is described by

- a) Private attributes of the object c) Attributes and methods of the object c) Methods of the object d) properties of the object plus the current values of each of these properties.

25. Which of the following is a difference between a relation in BCNF or in 3NF?

- a) A relation in BCNF has two or more candidate keys.
- b) A relation in BCNF has composite candidate key.
- c) A relation in BCNF has overlapping candidate keys.
- d) A relation in BCNF has all of the above.

26. Which of the following is not a step in query processing?

- a) Parsing and validating.
- b) Compiling
- c) Optimization
- d) Code generation

27. Which one of the following features must be present in data warehouse?

- a) Allows updates by the users
- b) Allows retrieval through the web.
- c) Data is organized around subject areas important to the management.
- d) Is refreshed as soon as data in OLTP system is updated.

28. Which one of the following is true about clustering?

- a) K-means is only method available.
- b) Number of clusters must be specified.
- c) Changing distance metric does not change the results.
- d) Training data must be available.

29. Which one of the following is not component of XML database?

- a) Query processor.
- b) Indexing
- c) Storage of elements.
- d) Domains.

30. Which of the following is taken as quality requirements

- a) Functional Requirement
- b) Implementation Goals
- c) Non functional Requirement
- d) Algorithm for Implementation

31. How many from below are examples of Black Box testing (tick all applicable)

- a) Data-flow testing
- b) Boundry value analysis
- c) Structural testing
- d) Partition testing

32. Risk Mitigation Plan

- a) Does not let the risk event happen b) Reduces the risk probability c) Reduces the risk impact d) Prioritize Risks

33. For Data Driven Development approach the system design strategy used should be

- a) Incremental b) Top down c) Bottom Up d) Evolutionary

34. A project has a budget of Rs. 10 Millions and schedule for 10 months. It is assumed that the total budget will be spent equally every month. After 2 months the project manager find that only 5% of work has been completed and a total of Rs. 1 Million spent. The percentage Schedule variance is :-

- a) 50% b) 25% c) 75% d) 80%

35. Which of the following statements is true for every planar graph of n vertices ?

- a) The graph is connected b) The graph is Eulerian c) The graph has a vertex-cover of size at most $3n/4$ d) The graph has an independent set of size at least $n/3$.

36. What kind of image we get when LPF filter is repeatedly applied (say infinite times) on the input image?

- e) High quality Image (b) Binary Image (c) Same as input image (d) Can not be guessed.

37. For the input image f, calculate output image pixel value R5 using following given median filter mask

$$\text{Output Image } \rightarrow f = \begin{bmatrix} 3 & 2 & 1 \\ 5 & 2 & 6 \\ 7 & 9 & 1 \end{bmatrix}$$

$$\text{Median filter mask } \rightarrow \begin{bmatrix} 0 & 1 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 0 \end{bmatrix}$$

$$R = \begin{bmatrix} R1 & R2 & R3 \\ R4 & R5 & R6 \\ R7 & R8 & R9 \end{bmatrix}$$

- e) $R5 = 2$ (b) $R5 = 5$ (c) $R5 = 6$ (d) $R5 = 9$

38. JPEG Compression is based on which of the following Transform.

- e) Walsh Transform (b) Fourier Transform (c) Wavelet Transform (d) Cosine Transform

39. Improved Gray Scale Quantization Technique of compression technique exploits which of the following redundancy.

- a) Interpixel redundancy (b) Psychovisual Redundancy (c) Data Redundancy (d) Temporal Redundancy

40. Given an image $f = \begin{bmatrix} 1 & 5 & 2 \\ 3 & 9 & 4 \\ 0 & 6 & 2 \end{bmatrix}$ Find DFT coefficient value $F(0, 0)$

1. $F(0,0) = 8$ (b) $F(0,0) = 32$ (c) $F(0,0) = 16$ (d) $F(0,0) = 0$

