

## PAPER-II COMPUTER SCIENCE AND APPLICATIONS

### Signature and Name of Invigilator

1. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

2. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

**J 8 7 1 2**

Time : 1 ¼ hours]

OMR Sheet No. : .....

(To be filled by the Candidate)

Roll No. 

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(In figures as per admission card)

Roll No. \_\_\_\_\_

(In words)

[Maximum Marks : 100

Number of Pages in this Booklet : 8

Number of Questions in this Booklet : 50

### Instructions for the Candidates

- Write your roll number in the space provided on the top of this page.
- This paper consists of fifty multiple-choice type of questions.
- At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
  - To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker-seal and do not accept an open booklet.
  - Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
  - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the circle as indicated below on the correct response against each item.  
**Example :**

Ⓐ	Ⓑ	●	Ⓓ
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where (C) is the correct response.
- Your responses to the items are to be indicated in the **OMR Sheet given inside the Paper I Booklet only**. If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
- Read instructions given inside carefully.
- Rough Work is to be done in the end of this booklet.
- If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
- You have to return the test question booklet and Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry duplicate copy of OMR Sheet on conclusion of examination.
- Use only Blue/Black Ball point pen.
- Use of any calculator or log table etc., is prohibited.
- There is no negative marks for incorrect answers.

### परीक्षार्थियों के लिए निर्देश

- पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
- इस प्रश्न-पत्र में पचास बहुविकल्पीय प्रश्न हैं ।
- परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
  - प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
  - कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चेक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।
  - इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
- प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।  
**उदाहरण :**

Ⓐ	Ⓑ	●	Ⓓ
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जबकि (C) सही उत्तर है ।
- प्रश्नों के उत्तर केवल प्रश्न पत्र I के अन्दर दिये गये OMR पत्रक पर ही अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
- अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
- कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
- यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
- आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
- केवल नीले/काले बाल प्वाइंट पेन का ही इस्तेमाल करें ।
- किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
- गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

**COMPUTER SCIENCE AND APPLICATIONS**  
**Paper – II**

**Note :** This paper contains **fifty (50)** objective type questions, each question carrying **two (2)** marks. Attempt **all** the questions.

- |   |  |
|---|--|
| <p>1. The postfix expression <math>AB + CD - *</math> can be evaluated using a</p> <p><input checked="" type="radio"/> (A) stack</p> <p>(B) tree</p> <p>(C) queue</p> <p>(D) linked list</p><br><p>2. The post order traversal of a binary tree is DEBFCA. Find out the pre-order traversal.</p> <p>(A) ABFCDE</p> <p>(B) ADBFEC</p> <p><input checked="" type="radio"/> (C) ABDECF</p> <p>(D) None of the above</p><br><p>3. The branch logic that provides making capabilities in the control unit is known as</p> <p><input checked="" type="radio"/> (A) Controlled transfer</p> <p>(B) Conditional transfer</p> <p>(C) Unconditional transfer</p> <p>(D) None of the above</p><br><p>4. The number of colours required to properly colour the vertices of every planer graph is</p> <p>(A) 2</p> <p>(B) 3</p> <p>(C) 4</p> <p><input checked="" type="radio"/> (D) 5</p> | <p>5. Networks that use different technologies can be connected by using</p> <p>(A) Packets</p> <p>(B) Switches</p> <p>(C) Bridges</p> <p><input checked="" type="radio"/> (D) Routers</p><br><p>6. Both hosts and routers are TCP/IP protocol software. However, routers do not use protocol from all layers. The layer for which protocol software is not needed by a router is</p> <p><input checked="" type="radio"/> (A) Layer – 5 (Application)</p> <p>(B) Layer – 1 (Physical)</p> <p>(C) Layer – 3 (Internet)</p> <p>(D) Layer – 2 (Network Interface)</p><br><p>7. In multiuser database if two users wish to update the same record at the same time, they are prevented from doing so by</p> <p>(A) Jamming</p> <p>(B) Password</p> <p>(C) Documentation</p> <p><input checked="" type="radio"/> (D) Record lock</p><br><p>8. A binary search tree is a binary tree :</p> <p>(A) All items in the left subtree are less than root</p> <p>(B) All items in the right subtree are greater than or equal to the root</p> <p>(C) Each subtree is itself a binary search tree</p> <p><input checked="" type="radio"/> (D) All of the above</p> |
|---|--|

9. What deletes the entire file except the file structure ?
- (A) ERASE
  - (B) DELETE
  - ☒ (C) ZAP
  - (D) PACK
10. Which command is the fastest among the following ?
- (A) COPY TO <NEW FILE>
  - ☒ (B) COPY STRUCTURE TO <NEW FILE>
  - (C) COPY FILE <FILE 1> <FILE 2>
  - (D) COPY TO MFILE-DAT DELIMITED
11. B+ tree are preferred to binary tree in Database because
- (A) Disk capacity are greater than memory capacities
  - ☒ (B) Disk access is much slower than memory access
  - (C) Disk data transfer rates are much less than memory data transfer rate
  - (D) Disks are more reliable than memory
12. A Transaction Manager is which of the following ?
- (A) Maintains a log of transactions
  - (B) Maintains before and after database images
  - (C) Maintains appropriate concurrency control
  - ☒ (D) All of the above

13. Leaves of which of the following trees are at the same level ?
- (A) Binary tree
  - ☒ (B) B-tree
  - (C) AVL-tree
  - (D) Expression tree
14. Which of the following TCP/IP Internet protocol is diskless machine uses to obtain its IP address from a server ?
- (A) RAP
  - (B) RIP
  - ☒ (C) ARP
  - (D) X.25
15. Decryption and encryption of data are the responsibility of which of the following layer ?
- (A) Physical layer
  - (B) Data Link layer
  - ☒ (C) Presentation layer
  - (D) Session layer
16. In which circuit switching, delivery of data is delayed because data must be stored and retrieved from RAM ?
- (A) Space division
  - ☒ (B) Time division
  - (C) Virtual
  - (D) Packet

17. In which Routing Method do all the routers have a common database ?  
 (A) Distance vector  
☒ (B) Link state  
 (C) Link vector  
 (D) Dijkstra method
18. Page Shift Keying (PSK) Method is used to modulate digital signal at 9600 bps using 16 level. Find the line signals and speed (i.e. modulation rate).  
☒ (A) 2400 bauds (B) 1200 bauds  
 (C) 4800 bauds (D) 9600 bauds
19. The station to hub distance in which it is 2000 metres.  
 (A) 100 Base-T<sub>x</sub>  
☒ (B) 100 Base-F<sub>x</sub>  
 (C) 100 Base-T<sub>4</sub>  
 (D) 100 Base-T<sub>1</sub>
20. Main aim of software engineering is to produce  
 (A) program  
 (B) software  
 (C) within budget  
☒ (D) software within budget in the given schedule
21. Key process areas of CMM level 4 are also classified by a process which is  
 (A) CMM level 2  
 (B) CMM level 3  
☒ (C) CMM level 5  
 (D) All of the above
22. Validation means  
 (A) are we building the product right  
☒ (B) are we building the right product  
 (C) verification of fields  
 (D) None of the above
23. If a process is under statistical control, then it is  
 (A) Maintainable  
 (B) Measurable  
☒ (C) Predictable  
 (D) Verifiable
24. In a function oriented design, we  
 (A) minimize cohesion and maximize coupling  
☒ (B) maximize cohesion and minimize coupling  
 (C) maximize cohesion and maximize coupling  
 (D) minimize cohesion and minimize coupling
25. Which of the following metric does not depend on the programming language used ?  
 (A) Line of code  
☒ (B) Function count  
 (C) Member of token  
 (D) All of the above
26. A / B<sup>+</sup> tree index is to be built on the name attribute of the relation STUDENT. Assume that all students names are of length 8 bytes, disk block are of size 512 bytes and index pointers are of size 4 bytes. Given this scenario what would be the best choice of the degree (i.e. the number of pointers per node) of the B<sup>+</sup> tree ?  
☒ (A) 16 (B) 42  
 (C) 43 (D) 44

27. The Inorder traversal of the tree will yield a sorted listing of elements of tree in
- (A) Binary tree
  - ☒ (B) Binary search tree
  - (C) Heaps
  - (D) None of the above
28. Mobile IP provides two basic functions.
- (A) Route discovery and registration
  - ☒ (B) Agent discovery and registration
  - (C) IP binding and registration
  - (D) None of the above
29. Pre-emptive scheduling is the strategy of temporarily suspending a running process
- ☒ (A) before the CPU time slice expires
  - (B) to allow starving processes to run
  - (C) when it requests I/O
  - (D) to avoid collision
30. In round robin CPU scheduling as time quantum is increased the average turn around time
- (A) increases
  - (B) decreases
  - (C) remains constant
  - ☒ (D) varies irregularly
31. Resources are allocated to the process on non-sharable basis is
- ☒ (A) mutual exclusion
  - (B) hold and wait
  - (C) no pre-emption
  - (D) circular wait
32. Cached and interleaved memories are ways of speeding up memory access between CPU's and slower RAM. Which memory models are best suited (i.e. improves the performance most) for which programs ?
- (i) Cached memory is best suited for small loops.
  - (ii) Interleaved memory is best suited for small loops
  - (iii) Interleaved memory is best suited for large sequential code.
  - (iv) Cached memory is best suited for large sequential code.
- (A) (i) and (ii) are true.
  - ☒ (B) (i) and (iii) are true.
  - (C) (iv) and (ii) are true.
  - (D) (iv) and (iii) are true.
33. Consider the following page trace :
- 4,3, 2, 1, 4, 3, 5, 4, 3, 2, 1, 5
- Percentage of page fault that would occur if FIFO page replacement algorithm is used with number of frames for the JOB  $m = 4$  will be
- (A) 8
  - (B) 9
  - ☒ (C) 10
  - (D) 12
34. Check sum used along with each packet computes the sum of the data, where data is treated as a sequence of
- (A) Integer
  - (B) Character
  - (C) Real numbers
  - ☒ (D) Bits

35. If an integer needs two bytes of storage, then the maximum value of a signed integer is

- (A)  $2^{16} - 1$
- ☒ (B)  $2^{15} - 1$
- (C)  $2^{16}$
- (D)  $2^{15}$

36. Which of the following logic families is well suited for high-speed operations ?

- (A) TTL
- ☒ (B) ECL
- (C) MOS
- (D) CMOS

37. Interrupts which are initiated by an instruction are

- (A) Internal
- (B) External
- (C) Hardware
- ☒ (D) Software

38. `printf("%c", 100);`

- (A) prints 100
- ☒ (B) prints ASCII equivalent of 100
- (C) prints garbage
- (D) none of the above

39. For the transmission of the signal, Bluetooth wireless technology uses

- (A) time division multiplexing
- (B) frequency division multiplexing
- ☒ (C) time division duplex
- (D) frequency division duplex

40. Consider the following statements :

- I. Recursive languages are closed under complementation.
- II. Recursively enumerable languages are closed under union.
- III. Recursively enumerable languages are closed under complementation.

Which of the above statements are true ?

- (A) I only
- ☒ (B) I and II
- (C) I and III
- (D) II and III

41. What is the routing algorithm used by RIP and IGRP ?

- (A) OSPF
- (B) Link-state
- (C) Dynamic
- ☒ (D) Dijkstra vector

42. Identify the incorrect statement :

- (A) The overall strategy drives the E-Commerce data warehousing strategy.
- (B) Data warehousing in an E-Commerce environment should be done in a classical manner.
- (C) E-Commerce opens up an entirely new world of web server.
- ☒ (D) E-Commerce security threats can be grouped into three major categories.

43. Reliability of software is directly dependent on

- (A) quality of the design
- ☒ (B) number of errors present
- (C) software engineers experience
- (D) user requirement

44. \_\_\_\_\_ is not an E-Commerce application.

- (A) House banking
- (B) Buying stocks
- (C) Conducting an auction
- ☒ (D) Evaluating an employee

45. \_\_\_\_\_ is a satellite based tracking system that enables the determination of person's position.

- (A) Bluetooth
- (B) WAP
- (C) Short Message Service
- ☒ (D) Global Positioning System

46. A complete microcomputer system consists of

- (A) Microprocessor
- (B) Memory
- (C) Peripheral equipment
- ☒ (D) All of the above

47. Where does a computer add and compare data ?

- (A) Hard disk
- (B) Floppy disk
- ☒ (C) CPU chip
- (D) Memory chip

48. Pipelining strategy is called implement

- (A) instruction execution
- ☒ (B) instruction prefetch
- (C) instruction decoding
- (D) instruction manipulation

49. Which of the following data structure is linear type ?

- (A) Strings
- (B) Lists
- (C) Queues
- ☒ (D) All of the above

50. To represent hierarchical relationship between elements, which data structure is suitable ?

- (A) Dequeue
- (B) Priority
- ☒ (C) Tree
- (D) All of the above

**Space For Rough Work**

Nta Ugc Net Yani Nimi G Net



PAPER : PAPER II

SUBJECT : ( 87 ) COMPUTER SCIENCE AND APPLICATION

QNO	KEY	QNO	KEY	QNO	KEY	QNO	KEY
1	A	26	A	51		76	
2	C	27	B	52		77	
3	A	28	B	53		78	
4	D	29	A	54		79	
5	D	30	D	55		80	
6	A	31	A	56		81	
7	D	32	B	57		82	
8	D	33	C	58		83	
9	C	34	D	59		84	
10	B	35	B	60		85	
11	B	36	B	61		86	
12	D	37	D	62		87	
13	B	38	B	63		88	
14	C	39	C	64		89	
15	C	40	B	65		90	
16	B	41	D	66		91	
17	B	42	D	67		92	
18	A	43	B	68		93	
19	B	44	D	69		94	
20	D	45	D	70		95	
21	C	46	D	71		96	
22	B	47	C	72		97	
23	C	48	B	73		98	
24	B	49	D	74		99	
25	B	50	C	75		100	

# PAPER-III

## COMPUTER SCIENCE AND APPLICATIONS

**Signature and Name of Invigilator**

1. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

2. (Signature) \_\_\_\_\_

(Name) \_\_\_\_\_

**J 8 7 1 2**

Time : 2 ½ hours]

OMR Sheet No. : .....

(To be filled by the Candidate)

Roll No. 

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(In figures as per admission card)

Roll No. \_\_\_\_\_

(In words)

[Maximum Marks : 150

Number of Pages in this Booklet : 12

Number of Questions in this Booklet : 75

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**Example :**

A	B	C	D
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

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- पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए ।
- इस प्रश्न-पत्र में पचहत्तर बहुविकल्पीय प्रश्न हैं ।
- परीक्षा प्रारम्भ होने पर, प्रश्न-पुस्तिका आपको दे दी जायेगी । पहले पाँच मिनट आपको प्रश्न-पुस्तिका खोलने तथा उसकी निम्नलिखित जाँच के लिए दिये जायेंगे, जिसकी जाँच आपको अवश्य करनी है :
  - प्रश्न-पुस्तिका खोलने के लिए उसके कवर पेज पर लगी कागज की सील को फाड़ लें । खुली हुई या बिना स्टीकर-सील की पुस्तिका स्वीकार न करें ।
  - कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न-पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चेक कर लें कि ये पूरे हैं । दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात् किसी भी प्रकार की त्रुटिपूर्ण पुस्तिका स्वीकार न करें तथा उसी समय उसे लौटाकर उसके स्थान पर दूसरी सही प्रश्न-पुस्तिका ले लें । इसके लिए आपको पाँच मिनट दिये जायेंगे । उसके बाद न तो आपकी प्रश्न-पुस्तिका वापस ली जायेगी और न ही आपको अतिरिक्त समय दिया जायेगा ।
  - इस जाँच के बाद OMR पत्रक की क्रम संख्या इस प्रश्न-पुस्तिका पर अंकित कर दें ।
- प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं । आपको सही उत्तर के वृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है ।  
**उदाहरण :**

A	B	C	D
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

 जबकि (C) सही उत्तर है ।
- प्रश्नों के उत्तर केवल प्रश्न पुस्तिका के अन्दर दिये गये OMR पत्रक पर ही अंकित करने हैं । यदि आप OMR पत्रक पर दिये गये वृत्त के अलावा किसी अन्य स्थान पर उत्तर चिह्नांकित करते हैं, तो उसका मूल्यांकन नहीं होगा ।
- अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें ।
- कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें ।
- यदि आप OMR पत्रक पर नियत स्थान के अलावा अपना नाम, रोल नम्बर, फोन नम्बर या कोई भी ऐसा चिह्न जिससे आपकी पहचान हो सके, अंकित करते हैं अथवा अभद्र भाषा का प्रयोग करते हैं, या कोई अन्य अनुचित साधन का प्रयोग करते हैं, तो परीक्षा के लिये अयोग्य घोषित किये जा सकते हैं ।
- आपको परीक्षा समाप्त होने पर प्रश्न-पुस्तिका एवं मूल OMR पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें । हालांकि आप परीक्षा समाप्ति पर OMR पत्रक की डुप्लीकेट प्रति अपने साथ ले जा सकते हैं ।
- केवल नीले/काले बाल प्वाइंट पेन का ही इस्तेमाल करें ।
- किसी भी प्रकार का संगणक (कैलकुलेटर) या लाग टेबल आदि का प्रयोग वर्जित है ।
- गलत उत्तरों के लिए कोई अंक काटे नहीं जाएँगे ।

**COMPUTER SCIENCE AND APPLICATIONS**  
**Paper – III**

**Note :** This paper contains **seventy five (75)** objective type questions of **two (2)** marks each.  
**All** questions are compulsory.

- Consider the following pseudocode segment :  
 $K := 0$   
for  $i_1 := 1$  to  $n$   
  for  $i_2 := 1$  to  $i_1$   
    :  
    :  
    :  
      for  $i_m := 1$  to  $i_{m-1}$   
         $K := K + 1$   
The value of  $K$  after the execution of this code shall be  
  - (A)  $C(n + m - 1, m)$
  - (B)  $C(n - m + 1, m)$
  - (C)  $C(n + m - 1, n)$
  - (D)  $C(n - m + 1, n)$
- In Delta Rule for error minimization  
  - (A) weights are adjusted w.r.to change in the output
  - (B) weights are adjusted w.r.to difference between desired output and actual output
  - (C) weights are adjusted w.r.to difference between input and output
  - (D) none of the above
- The concept of pipelining is most effective in improving performance if the tasks being performed in different stages :  
  - (A) require different amount of time
  - (B) require about the same amount of time
  - (C) require different amount of time with time difference between any two tasks being same
  - (D) require different amount with time difference between any two tasks being different

4. What is Granularity ?
- (A) The size of database  
(B) The size of data item  
(C) The size of record  
(D) The size of file
5. Suppose that a given application is run on a 64-processor machine and that 70 percent of the application can be parallelized. Then the expected performance improvement using Amdahl's law is
- (A) 4.22 (B) 3.22  
(C) 3.32 (D) 3.52
6. If two fuzzy sets A and B are given with membership functions
- $$\mu_A(x) = \{0.2, 0.4, 0.8, 0.5, 0.1\}$$
- $$\mu_B(x) = \{0.1, 0.3, 0.6, 0.3, 0.2\}$$
- Then the value of  $\mu_{\overline{A \cap B}}$  will be
- (A) {0.9, 0.7, 0.4, 0.8, 0.9}  
(B) {0.2, 0.4, 0.8, 0.5, 0.2}  
(C) {0.1, 0.3, 0.6, 0.3, 0.1}  
(D) {0.7, 0.3, 0.4, 0.2, 0.7}
7. Match the following :
- |                     |                    |
|---------------------|--------------------|
| (i) OLAP            | (a) Regression     |
| (ii) OLTP           | (b) Data Warehouse |
| (iii) Decision Tree | (c) RDBMS          |
| (iv) Neural Network | (d) Classification |
- (i) (ii) (iii) (iv)
- (A) (b) (c) (a) (d)  
(B) (b) (c) (d) (a)  
(C) (c) (b) (a) (d)  
(D) (c) (b) (d) (a)

8. Which level of Abstraction describes what data are stored in the Database ?  
 (A) Physical level  
 (B) View level  
 (C) Abstraction level  
 (D) Logical level
9. The problem that occurs when one transaction updates a database item and then the transaction fails for some reason is \_\_\_\_\_.  
 (A) Temporary Select Problem  
 (B) Temporary Modify Problem  
 (C) Dirty Read Problem  
 (D) None
10. In an image compression system 16384 bits are used to represent  $256 \times 256$  image with 256 gray levels. What is the compression ratio for this system ?  
 (A) 1 (B) 2  
 (C) 4 (D) 8
11. X.25 is \_\_\_\_\_ Network.  
 (A) Connection Oriented Network  
 (B) Connection Less Network  
 (C) Either Connection Oriented or Connection Less  
 (D) Neither Connection Oriented nor Connection Less
12. Which of the following can be used for clustering of data ?  
 (A) Single layer perception  
 (B) Multilayer perception  
 (C) Self organizing map  
 (D) Radial basis function
13. Which of the following is scheme to deal with deadlock ?  
 (A) Time out  
 (B) Time in  
 (C) Both (A) & (B)  
 (D) None of the above

14. If the pixels of an image are shuffled then the parameter that may change is  
 (A) Histogram (B) Mean  
 (C) Entropy (D) Covariance
15. The common property of functional language and logical programming language :  
 (A) Both are declarative  
 (B) Both are based on  $\lambda$ -calculus  
 (C) Both are procedural  
 (D) Both are functional
16. Given the following statements :  
 (i) The power of deterministic finite state machine and non-deterministic finite state machine are same.  
 (ii) The power of deterministic pushdown automaton and non-deterministic pushdown automaton are same.  
 Which of the above is the correct statement(s) ?  
 (A) Both (i) and (ii)  
 (B) Only (i)  
 (C) Only (ii)  
 (D) Neither (i) nor (ii)
17. Let  $Q(x, y)$  denote " $x + y = 0$ " and let there be two quantifications given as  
 (i)  $\exists y \forall x Q(x, y)$   
 (ii)  $\forall x \exists y Q(x, y)$   
 where  $x$  &  $y$  are real numbers. Then which of the following is valid ?  
 (A) (i) is true & (ii) is false.  
 (B) (i) is false & (ii) is true.  
 (C) (i) is false & (ii) is also false.  
 (D) both (i) & (ii) are true.

18. Consider a schema  $R(A, B, C, D)$  and functional dependencies  $A \rightarrow B$  and  $C \rightarrow D$ . Then the decomposition  $R_1(A, B)$  and  $R_2(C, D)$  is
- ☒ (A) Dependency preserving but not lossless join
  - (B) Dependency preserving and lossless join
  - (C) Lossless Join but not dependency preserving
  - (D) Lossless Join
19. The quantiser in an image-compression system is a
- ☒ (A) lossy element which exploits the psychovisual redundancy
  - (B) lossless element which exploits the psychovisual redundancy
  - (C) lossy element which exploits the statistical redundancy
  - (D) lossless element which exploits the statistical redundancy
20. Data Warehouse provides
- (A) Transaction Responsiveness
  - ☒ (B) Storage, Functionality Responsiveness to queries
  - (C) Demand and Supply Responsiveness
  - (D) None of the above
21. A\* algorithm uses  $f' = g + h'$  to estimate the cost of getting from the initial state to the goal state, where  $g$  is a measure of the cost of getting from initial state to the current node and the function  $h'$  is an estimate of the cost of getting from the current node to the goal state. To find a path involving the fewest number of steps, we should set
- ☒ (A)  $g = 1$                       (B)  $g = 0$
  - (C)  $h' = 0$                       (D)  $h' = 1$
22. The transform which possesses the highest 'energy compaction' property is
- (A) Slant transform
  - (B) Cosine transform
  - (C) Fourier transform
  - ☒ (D) Karhunen-Loeve transform
23. Which one of the following prolog programs correctly implement "if G succeeds then execute goal P else execute goal  $\theta$ ?"
- (A) if-else (G, P,  $\theta$ ) :- !, call(G), call(P).  
if-else (G, P,  $\theta$ ) :- call( $\theta$ ).
  - ☒ (B) if-else (G, P,  $\theta$ ) :- call(G), !, call(P).  
if-else (G, P,  $\theta$ ) :- call( $\theta$ ).
  - (C) if-else (G, P,  $\theta$ ) :- call(G), call(P), !.  
if-else (G, P,  $\theta$ ) :- call( $\theta$ ).
  - (D) All of the above
24. The \_\_\_\_\_ memory allocation function modifies the previous allocated space.
- (A) calloc( )                      (B) free( )
  - (C) malloc( )                      ☒ (D) realloc( )
25. Which is not the correct statement(s) ?
- (i) Every context sensitive language is recursive.
  - (ii) There is a recursive language that is not context sensitive.
  - (A) (i) is true, (ii) is false.
  - ☒ (B) (i) is true and (ii) is true.
  - (C) (i) is false, (ii) is false.
  - (D) (i) is false and (ii) is true.
26. The mechanism that binds code and data together and keeps them secure from outside world is known as
- (A) Abstraction
  - (B) Inheritance
  - ☒ (C) Encapsulation
  - (D) Polymorphism

27. Identify the addressing modes of below instructions and match them :

- (a) ADI (1) Immediate addressing  
(b) STA (2) Direct addressing  
(c) CMA (3) Implied addressing  
(d) SUB (4) Register addressing

- (A)  $a - 1, b - 2, c - 3, d - 4$   
(B)  $a - 2, b - 1, c - 4, d - 3$   
(C)  $a - 3, b - 2, c - 1, d - 4$   
(D)  $a - 4, b - 3, c - 2, d - 1$

28. Which one of the following is not a Greibach Normal form grammar ?

- (i)  $S \rightarrow a \mid bA \mid aA \mid bB$   
 $A \rightarrow a$   
 $B \rightarrow b$

- (ii)  $S \rightarrow a \mid aA \mid AB$   
 $A \rightarrow a$   
 $B \rightarrow b$

- (iii)  $S \rightarrow a \mid A \mid aA$   
 $A \rightarrow a$

- (A) (i) and (ii)  
(B) (i) and (iii)  
(C) (ii) and (iii)  
(D) (i), (ii) and (iii)

29. Which of the following IP address class is a multicast address ?

- (A) Class A (B) Class B  
(C) Class C (D) Class D

30. While unit testing a module, it is found that for a set of test data, maximum 90% of the code alone were tested with a probability of success 0.9. The reliability of the module is

- (A) atleast greater than 0.9  
(B) equal to 0.9  
(C) atmost 0.81  
(D) atleast 1/0.81

31. The upper bound of computing time of m coloring decision problem is

- (A)  $O(nm)$  (B)  $O(n^m)$   
(C)  $O(nm^n)$  (D)  $O(n^m m^n)$

32. The equivalent grammar corresponding to the grammar  $G : S \rightarrow aA, A \rightarrow BB, B \rightarrow aBb \mid \epsilon$  is

- (A)  $S \rightarrow aA, A \rightarrow BB, B \rightarrow aBb$   
(B)  $S \rightarrow alaA, A \rightarrow BB, B \rightarrow aBb \mid ab$   
(C)  $S \rightarrow a \mid aA, A \rightarrow BB \mid B, B \rightarrow aBb$   
(D)  $S \rightarrow a \mid aA, A \rightarrow BB \mid B, B \rightarrow aBb \mid ab$

33. Which one of the following statements is incorrect ?

- (A) The number of regions corresponds to the cyclomatic complexity.  
(B) Cyclometric complexity for a flow graph  $G$  is  $V(G) = N - E + 2$ , where  $E$  is the number of edges and  $N$  is the number of nodes in the flow graph.  
(C) Cyclometric complexity for a flow graph  $G$  is  $V(G) = E - N + 2$ , where  $E$  is the number of edges &  $N$  is the number of nodes in the flow graph.  
(D) Cyclometric complexity for a flow graph  $G$  is  $V(G) = P + 1$ , where  $P$  is the number of predicate nodes contained in the flow graph  $G$ .

34. Consider a weighted undirected graph with positive edge weights and let  $(u, v)$  be an edge in the graph. It is known that the shortest path from source vertex  $s$  to  $u$  has weight 53 and shortest path from  $s$  to  $v$  has weight 65. Which statement is always true ?

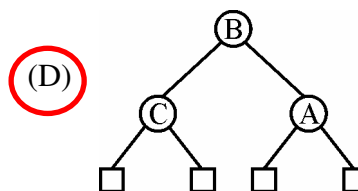
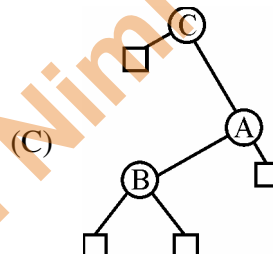
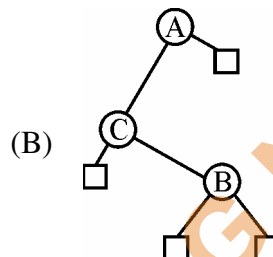
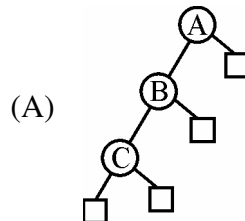
- (A)  $\text{Weight}(u, v) \leq 12$   
(B)  $\text{Weight}(u, v) = 12$   
(C)  $\text{Weight}(u, v) \geq 12$   
(D)  $\text{Weight}(u, v) > 12$

35. Consider the regular expression  $(a + b)(a + b) \dots (a + b)$  ( $n$ -times). The minimum number of states in finite automaton that recognizes the language represented by this regular expression contains

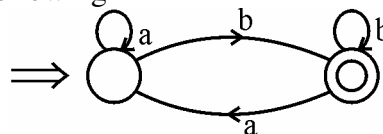
- (A)  $n$  states (B)  $n + 1$  states  
(C)  $n + 2$  states (D)  $2^n$  states

36. Number of binary trees formed with 5 nodes are  
 (A) 32 (B) 36  
 (C) 120 (D) 42
37. Are we building the right product ?  
 This statement refers to  
 (A) Verification  
 (B) Validation  
 (C) Testing  
 (D) Software quality assurance
38. The following postfix expression is evaluated using a stack  
 $823^{\wedge}/23^* + 51^* -$   
 The top two elements of the stack after first \* is evaluated  
 (A) 6, 1 (B) 5, 7  
 (C) 3, 2 (D) 1, 5
39. The following CFG  
 $S \rightarrow aB \mid bA, A \rightarrow a \mid as \mid bAA,$   
 $B \rightarrow b \mid bs \mid aBB$   
 generates strings of terminals that have  
 (A) odd number of a's and odd number of b's  
 (B) even number of a's and even number of b's  
 (C) equal number of a's and b's  
 (D) not equal number of a's and b's
40. Consider the following pseudo-code :  
 If  $(A > B)$  and  $(C > D)$  then  
 $A = A + 1$   
 $B = B + 1$   
 Endif  
 The cyclomatic complexity of the pseudo-code is  
 (A) 2 (B) 3  
 (C) 4 (D) 5
41. Which layer of OSI reference model uses the ICMP (Internet Control Message Protocol) ?  
 (A) Transport layer  
 (B) Data link layer  
 (C) Network layer  
 (D) Application layer

42. Which one of the following binary search tree is optimal, if probabilities of successful search and unsuccessful search are same ?



43. The regular expression for the following DFA



is

- (A)  $ab^*(b + aa^*b)^*$   
 (B)  $a^*b(b + aa^*b)^*$   
 (C)  $a^*b(b^* + aa^*b)$   
 (D)  $a^*b(b^* + aa^*b)^*$



44. Which diagram provides a formal graphic notation for modelling objects, classes and their relationships to one another ?

- ☒ (A) Object diagram
- (B) Class diagram
- (C) Instance diagram
- (D) Analysis diagram

45. A computer system supports 32 bit virtual address as well as 32 bit physical addresses. Since the virtual address space is of same size as that of physical address space, if we want to get rid of virtual memory, which one of the following is true ?

- (A) Efficient implementation of multiuser support is no longer possible.
- (B) The processor cache can be made more efficient.
- ☒ (C) Hardware support for memory management is not needed.
- (D) CPU scheduling can be made more efficient.

46. The feasible region represented by the constraints  $x_1 - x_2 \leq 1$ ,  $x_1 + x_2 \geq 3$ ,  $x_1 \geq 0$ ,  $x_2 \geq 0$  of the objective function  $\text{Max } Z = 3x_1 + 2x_2$  is

- (A) A polygon
- ☒ (B) Unbounded feasible region
- (C) A point
- (D) None of these

47. The colour of an object is largely determined by its diffuse reflection coefficient. If  $K_d = (0.8, 0.4, 0)$ , then what shall be the colour of the object, if the light used is blue and magenta ?

- (A) White and Red
- (B) Red and Blue
- (C) Black and White
- ☒ (D) Black and Red

48. If an instruction takes 'i' microseconds and a page fault takes an additional 'j' microseconds. The effective instruction time, if on the average a page fault occurs every k instructions, is

- ☒ (A)  $i + j/k$
- (B)  $i + j * k$
- (C)  $(i + j)/k$
- (D)  $(i + j) * k$

49. In any simplex table, if corresponding to any negative  $\Delta_j$ , all elements of the column are negative or zero, the solution under the test is

- (A) degenerate solution
- ☒ (B) unbounded solution
- (C) alternative solution
- (D) non-existing solution

50. How many relations are there on a set with n elements that are symmetric and a set with n elements that are reflexive and symmetric ?

- (A)  $2^{n(n+1)/2}$  and  $2^n \cdot 3^{n(n-1)/2}$
- (B)  $3^{n(n-1)/2}$  and  $2^{n(n-1)}$
- (C)  $2^{n(n+1)/2}$  and  $3^{n(n-1)/2}$
- ☒ (D)  $2^{n(n+1)/2}$  and  $2^{n(n-1)/2}$

51. The strategy used to reduce the number of tree branches and the number of static evaluations applied in case of a game tree is

- (A) Minmax strategy
- ☒ (B) Alpha-beta pruning strategy
- (C) Constraint satisfaction strategy
- (D) Static max strategy

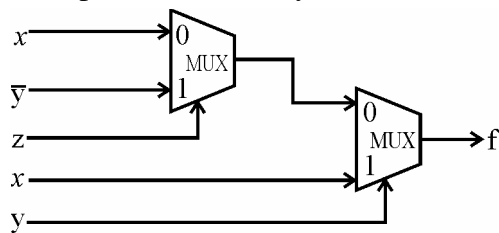
52. Match the following :

- |                                |                                    |
|--------------------------------|------------------------------------|
| (i) Regular Grammar            | (a) Pushdown automaton             |
| (ii) Context free Grammar      | (b) Linear bounded automaton       |
| (iii) Unrestricted Grammar     | (c) Deterministic finite automaton |
| (iv) Context Sensitive Grammar | (d) Turing machine                 |

- |                                      |     |      |       |      |
|--------------------------------------|-----|------|-------|------|
|                                      | (i) | (ii) | (iii) | (iv) |
| (A)                                  | (c) | (a)  | (b)   | (d)  |
| <input checked="" type="radio"/> (B) | (c) | (a)  | (d)   | (b)  |
| (C)                                  | (c) | (b)  | (a)   | (d)  |
| (D)                                  | (c) | (b)  | (d)   | (a)  |



53. Consider the below circuit and find the output function  $f(x, y, z)$ .



- (A)  $x\bar{z} + xy + \bar{y}z$   
 (B)  $x\bar{z} + xy + \bar{y}\bar{z}$   
 (C)  $xz + xy + \bar{y}\bar{z}$   
 (D)  $xz + x\bar{y} + \bar{y}z$
54. What is the size (in terms of bits) of Header length field in IPV4 header ?  
 (A) 2 (B) 4  
 (C) 8 (D) 16
55. Match the following with respect to java.util.\* class methods :
- |               |                                |
|---------------|--------------------------------|
| (a) Bit Set   | (i) Time zone                  |
|               | getTimezone()                  |
| (b) Calendar  | (ii) int hashCode()            |
| (c) Time zone | (iii) int nextInt()            |
| (d) Random    | (iv) Void setID(String tzName) |
- (a) (b) (c) (d)  
 (A) (ii) (i) (iv) (iii)  
 (B) (iii) (iv) (i) (ii)  
 (C) (iv) (iii) (ii) (i)  
 (D) (ii) (i) (iii) (iv)
56. \_\_\_\_\_ is sometimes said to be object oriented, because the only way to manipulate kernel objects is by invoking methods on their handles.  
 (A) Windows NT  
 (B) Windows XP  
 (C) Windows VISTA  
 (D) Windows 95/98

57. A user level process in Unix traps the signal sent on a Ctrl + C input and has a signal handling routine that saves appropriate files before terminating the process. When a Ctrl + C input is given to this process, what is the mode in which the signal handling routine executes ?

(A) User mode  
 (B) Kernel mode  
 (C) Superuser mode  
 (D) Privileged mode

58. A CPU generally handles an interrupt by executing an interrupt service routine

(A) as soon as an interrupt is raised  
 (B) by checking the interrupt register at the end of fetch cycle  
 (C) by checking the interrupt register after finishing the executing the current instruction  
 (D) by checking the interrupt register at fixed time intervals

59. The perspective projection matrix, on the view plane  $z = d$  where the centre of projection is the origin (0, 0, 0) shall be

(A) 
$$\begin{bmatrix} 0 & 0 & 0 & d \\ 0 & 0 & d & 0 \\ 0 & d & 0 & 0 \\ d & 0 & 0 & 1 \end{bmatrix}$$

(B) 
$$\begin{bmatrix} d & 0 & 0 & 0 \\ d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \end{bmatrix}$$

(C) 
$$\begin{bmatrix} 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & d \\ 0 & 0 & d & 0 \\ 0 & d & 0 & 0 \end{bmatrix}$$

(D) 
$$\begin{bmatrix} 1 & 0 & 0 & 0 \\ d & 0 & 0 & 0 \\ 0 & d & 0 & 0 \\ 0 & 0 & d & 0 \end{bmatrix}$$

60. Radio signals generally propagate according to the following mechanisms:

- (A) Modulation, Amplification, Scattering
- (B) Reflection, Diffraction, Scattering**
- (C) Amplification, Diffraction, Modulation
- (D) Reflection, Amplification, Diffraction

61. Identify the devices given below with their IC numbers :

- (i) USART (a) 8251
- (ii) Micro controller (b) 8051
- (iii) Interrupt controller (c) 8259
- (iv) DMA controller (d) 8257

(i) (ii) (iii) (iv)

- (A) (a) (b) (c) (d)**
- (B) (b) (a) (d) (c)
- (C) (c) (d) (a) (b)
- (D) (d) (a) (b) (c)

62. The optimal solution of the following assignment problem using Hungarian method is

	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

(A) (B) (C) (D)

- (A) (I) (II) (III) (IV)
- (B) (I) (III) (II) (IV)**
- (C) (I) (III) (IV) (II)
- (D) (I) (IV) (II) (III)

63. If a and b are the end points of a line, then which one of the following is true ?

- (A) If both end points are left, right, above or below the window, the line is invisible.
- (B) If both end points are left, right, above or below the window, the line is completely visible.
- (C) If both end points are left, right, above or below the window, the line is trivially visible.
- (D) If both end points are left, right, above or below the window, the line is trivially invisible.

64. Match the following with link quality measurement and handoff initiation :

- (a) Networked- Controlled Handoff (NCHO)
- (b) Mobile-Assisted Handoff (MAHO)
- (c) Forward Handoff
- (d) Hard Handoff
- (i) MS connect to BS
- (ii) Process via channel the target BS
- (iii) First Generation Analog Cellular System
- (iv) Second Generation Digital Cellular System

(a) (b) (c) (d)

- (A) (iii) (iv) (ii) (i)**
- (B) (ii) (iii) (i) (iv)
- (C) (ii) (i) (iv) (iii)
- (D) (iv) (iii) (i) (ii)

65. Consider the methods used by processes  $P_1$  and  $P_2$  for accessing their critical sections. The initial values of shared Boolean variables  $S_1$  and  $S_2$  are randomly assigned,

$P_1$	$P_2$
while ( $S_1 = S_2$ );	while ( $S_1 = S_2$ );
critical section	critical section
$S_1 = S_2$ ;	$S_1 = S_2$ ;

Which one of the following statements describes the properties achieved ?

- (A) Mutual exclusion but not progress  
 (B) Progress but not mutual exclusion  
☒ (C) Neither mutual exclusion nor progress  
 (D) Both mutual exclusion and progress
66. If the period of a signal is 1000 ms, then what is its frequency in kilohertz ?  
☒ (A)  $10^{-3}$  KHz      (B)  $10^{-2}$  KHz  
 (C)  $10^{-1}$  KHz      (D) 1 KHz
67. Let  $a * H$  and  $b * H$  be two cosets of  $H$ .  
 (i) Either  $a * H$  and  $b * H$  are disjoint  
 (ii)  $a * H$  and  $b * H$  are identical  
 Then,  
 (A) only (i) is true  
 (B) only (ii) is true  
☒ (C) (i) or (ii) is true  
 (D) (i) and (ii) is false

68. HTML is defined using SGML – an \_\_\_\_\_ standard, information processing-text and office systems (SGML) for text information processing.

(A) ISO – 8878  
☒ (B) ISO – 8879  
 (C) ISO – 8880  
 (D) ISO – 8881

69. What is the meaning of 'Hibernate' in Windows XP/Windows 7 ?

(A) Restart the computers in safe mode.  
 (B) Restart the computers in normal mode.  
 (C) Shutdown the computer terminating all the running applications.  
☒ (D) Shutdown the computer without closing the running applications.

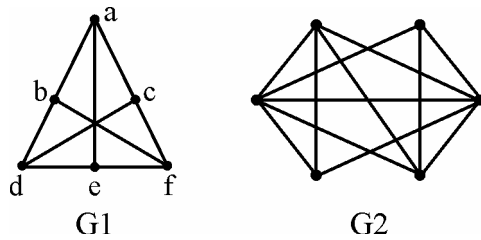
70. Assume that we have constructor functions for both base class and derived class. Now consider the declaration in `main()`. `Base * P = New Derived;` in what sequence will the constructor be called ?

(A) Derived class constructor followed by Base class constructor.  
☒ (B) Base class constructor followed by derived class constructor.  
 (C) Base class constructor will not be called.  
 (D) Derived class constructor will not be called.

71. Which one of the following options is not a shell in UNIX system ?

- (A) Bourne Shell
- (B) C Shell
- ☒ (C) Net Shell
- (D) Korn Shell

72.



G1 and G2 are two graphs as shown :

- (A) Both G1 and G2 are planar graphs.
- (B) Both G1 and G2 are not planar graphs.
- (C) G1 is planar and G2 is not planar graph.
- ☒ (D) G1 is not planar and G2 is planar graph.

73. In which file the compiler manage the various objects, which are used in windows programming ?

- (A) Control File
- (B) Binary File
- ☒ (C) Text File
- (D) Obj File

74. On a disk with 1000 cylinders (0 to 999) find the number of tracks, the disk arm must move to satisfy all the requests in the disk queue. Assume the last request service was at track 345 and the head is moving toward track 0. The queue in FIFO order contains requests for the following tracks :

123, 874, 692, 475, 105, 376

(Assume SCAN algorithm)

- (A) 2013
- ☒ (B) 1219
- (C) 1967
- (D) 1507

75. Halftoning is defined as

- (A) a technique to obtain increased visual resolution using multiple intensity levels.
- ☒ (B) a technique for using minimum number of intensity levels to obtain increased visual resolution.
- (C) a technique to obtain increased visual resolution using maximum number of intensity levels.
- (D) a technique for using appropriate number intensity levels to obtain increased visual resolution.

**Space For Rough Work**

**Nta Ugc Net Yani Nimi G Net**

UGC - NET JUNE 2012

PAPER : PAPER III

OPTION :

SUBJECT : ( 87 ) COMPUTER SCIENCE AND APPLICATION

QNO	KEY	QNO	KEY	QNO	KEY	QNO	KEY
1	A	26	C	51	B	76	
2	B	27	A	52	B	77	
3	B	28	C	53	A	78	
4	B	29	D	54	B	79	
5	B	30	C	55	A	80	
6	X	31	C	56	A	81	
7	B	32	D	57	B	82	
8	D	33	B	58	C	83	
9	C	34	C	59	B	84	
10	X	35	B	60	B	85	
11	A	36	D	61	A	86	
12	C	37	B	62	B	87	
13	A	38	A	63	D	88	
14	D	39	C	64	A	89	
15	A	40	B	65	C	90	
16	B	41	C	66	A	91	
17	B	42	D	67	C	92	
18	A	43	D	68	B	93	
19	A	44	A	69	D	94	
20	B	45	C	70	B	95	
21	A	46	B	71	C	96	
22	D	47	D	72	D	97	
23	B	48	A	73	C	98	
24	D	49	B	74	B	99	
25	B	50	D	75	B	100	

X = MARKS AWARDED TO ALL APPEARED CANDIDATES