**Signature and Name of Invigilator**

1. (Signature) _____

   (Name) _____

2. (Signature) _____

   (Name) _____

**OMR Sheet No. :** .....

(To be filled by the Candidate)

**Roll No.** | | | | | | | |

(In figures as per admission card)

**Roll No.** _____

(In words)

**J–8709**

**PAPER – II**

**Test Booklet No.**

# COMPUTER SCIENCE AND APPLICATIONS

**Time : 1¼ hours]** **[Maximum Marks : 100**

Number of Pages in this Booklet : **8** Number of Questions in this Booklet : **50**

## Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. 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 :
   (i) 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.
   (ii) **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.**
   (iii) After this verification is over, the Test Booklet Number should be entered in the OMR Sheet and the OMR Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.

   **Example :** (A) (B) ● (D)

   where (C) is the correct response.
5. Your responses to the items are to be indicated in the Answer Sheet given **inside the Paper I booklet only**. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the test booklet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test question booklet and OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall.
10. **Use only Blue/Black Ball point pen.**
11. **Use of any calculator or log table etc., is prohibited.**
12. **There is NO negative marking.**

## परीक्षार्थियों के लिए निर्देश

1. पहले पृष्ठ के ऊपर नियत स्थान पर अपना रोल नम्बर लिखिए।
2. इस प्रश्न–पत्र में पचास बहुविकल्पीय प्रश्न हैं।
3. 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 :
   (i) 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।
   (ii) **कवर पृष्ठ पर छपे निर्देशानुसार प्रश्न–पुस्तिका के पृष्ठ तथा प्रश्नों की संख्या को अच्छी तरह चैक कर लें कि ये पूरे हैं। दोषपूर्ण पुस्तिका जिनमें पृष्ठ/प्रश्न कम हों या दुबारा आ गये हों या सीरियल में न हों अर्थात 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।**
   (iii) इस जाँच के बाद प्रश्न–पुस्तिका की क्रम संख्या OMR पत्रक पर अंकित करें और OMR पत्रक की क्रम संख्या इस प्रश्न–पुस्तिका पर अंकित कर दें।
4. प्रत्येक प्रश्न के लिए चार उत्तर विकल्प (A), (B), (C) तथा (D) दिये गये हैं। आपको सही उत्तर के दीर्घवृत्त को पेन से भरकर काला करना है जैसा कि नीचे दिखाया गया है।

   **उदाहरण :** (A) (B) ● (D)

   जबकि (C) सही उत्तर है।
5. प्रश्नों के उत्तर **केवल प्रश्न पत्र I के अन्दर दिये गये** उत्तर–पत्रक पर ही अंकित करने हैं। यदि आप उत्तर पत्रक पर दिये गये दीर्घवृत्त के अलावा किसी अन्य स्थान पर उत्तर चिन्हांकित करते है, तो उसका मूल्यांकन नहीं होगा।
6. अन्दर दिये गये निर्देशों को ध्यानपूर्वक पढ़ें।
7. कच्चा काम (Rough Work) इस पुस्तिका के अन्तिम पृष्ठ पर करें।
8. यदि आप उत्तर–पुस्तिका पर अपना नाम या ऐसा कोई भी निशान जिससे आपकी पहचान हो सके, किसी भी भाग पर दर्शाते या अंकित करते हैं तो परीक्षा के लिये अयोग्य घोषित कर दिये जायेंगे।
9. आपको परीक्षा समाप्त होने पर प्रश्न–पुस्तिका एवं OMR उत्तर–पत्रक निरीक्षक महोदय को लौटाना आवश्यक है और परीक्षा समाप्ति के बाद उसे अपने साथ परीक्षा भवन से बाहर न लेकर जायें।
10. **केवल नीले/काले बाल प्वाईंट पैन का ही इस्तेमाल करें।**
11. **किसी भी प्रकार का संगणक ( कैलकुलेटर ) या लाग टेबल आदि का प्रयोग वर्जित है।**
12. **गलत उत्तर के लिए अंक नहीं काटे जायेंगे।**

# Computer Science and Applications

## PAPER – II

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

**1.** If $x$ and $y$ are independent Gaussian random variables with average value 0 and with same variance, their joint probability density function is given by :

(A) $p(x, y) = p(x) \cdot p(y)$ (B) $p(x, y) = p(x) + p(y)$

(C) $p(x, y) = p(x + y)$ (D) $p(x, y) = p(x) \cdot p(y) + p(x)$

**2.** In order that a code is '$t$' error correcting, the minimum Hamming distance should be :

(A) $t$ (B) $2t - 1$ (C) $2t$ (D) $2t + 1$

**3.** The Boolean expression $\bar{x}\ \bar{y}\ z + y\,z + x\,z$ is equivalent to :

(A) $x$ (B) $y$ (C) $z$ (D) $x + y + z$

**4.** The characteristic equation of a JK flip flop is :

(A) $Q_{n+1} = J.Q_n + K.Q_n$ (B) $Q_{n+1} = J.\overline{Q}_n + \overline{K}.Q_n$

(C) $Q_{n+1} = Q_n\ J.K$ (D) $Q_{n+1} = (J + k)Q_n$

**5.** In order to implement a $n$ variable switching function, a MUX must have :

(A) $2^n$ inputs (B) $2^n + 1$ inputs (C) $2^{n-1}$ inputs (D) $2^n - 1$ inputs

**6.** The throughput of pure ALOHA is given by :

(A) $S = G$ (B) $S = e^{2G}$ (C) $S = Ge^{2G}$ (D) $S = Ge^{-2G}$

**7.** The Fiber Distributed Data Interface uses :

(A) single mode fibers and LEDs (B) multimode fibers and LEDs

(C) single mode fibers and ILDs (D) multimode fibers and ILDs

**8.** To employ multi-access in GSM, users are given different :

(A) time slots (B) bandpass filters

(C) handsets (D) frequency bands

**9.** With a four programs in memory and with 80% average I/O wait, the CPU utilization is ?

(A) 60% (B) 70% (C) 90% (D) 100%

**10.** Assume N segments in memory and a page size of P bytes. The wastage on account of internal fragmentation is :

(A) NP/2 bytes (B) P/2 bytes (C) N/2 bytes (D) NP bytes

**11.** **Assertion (A) :** Bit maps are not often used in memory management.
**Reason (R) :** Searching a bit map for a run of given length is a slow operation.
(A) Both **(A)** and **(R)** are true and **(R)** is correct explanation for **(A)**
(B) Both **(A)** and **(R)** are true but **(R)** is not correct explanation for **(A)**
(C) **(A)** is true **(R)** is false
(D) **(A)** is false **(R)** is true

**12.** The complete graph with four vertices has $k$ edges where $k$ is :
(A) 3 (B) 4 (C) 5 (D) 6

**13.** The octal equivalent of hexadecimal $(A.B)_{16}$ is :
(A) 47.21 (B) 12.74 (C) 12.71 (D) 17.21

**14.** A reduced state table has 18 rows. The minimum number of Flips flops needed to implement the sequential machine is :
(A) 18 (B) 9 (C) 5 (D) 4

**15.** What is the value of 'b' after the execution of the following code statements :
c = 10;
b = + + c + + + c;
(A) 20 (B) 22 (C) 23 (D) None

**16.** Which of the following does not represent a valid storage class in 'c' ?
(A) automatic (B) static (C) union (D) extern

**17.** The friend functions are used in situations where :
(A) We want to have access to unrelated classes
(B) Dynamic binding is required
(C) Exchange of data between classes to take place
(D) None of the above

**18.** (i) DML includes a query language based on both relation algebra and tuple calculus
(ii) DML includes a query language based on tuple calculus
(iii) DML includes a query language based on relational algebra
(iv) DML includes a query language based on none of the relational algebra and tuple calculus
Which one is correct ?
(A) (i) only (B) (ii) only (C) (iii) only (D) (iv) only

**19.** Suppose it takes 100 ns to access a page table and 20 ns to access associative memory with a 90% hit rate, the average access time equals :
(A) 20 ns (B) 28 ns (C) 90 ns (D) 100 ns

**20.** There exists a construct which returns a value 'true' if the argument subquery is :
(A) empty (B) non-empty
(C) in error (D) none of the above

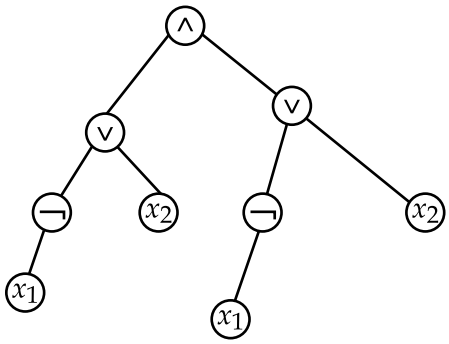
**21.** Which construct in SQL is used to test whether a subquery has any tuples in its result ?
(A) UNIQUE (B) EXISTS (C) GROUP BY (D) EXCEPT

**22.** ORACLE supports :
(A) inner join and outer join only
(B) outer join and semi join only
(C) inner join, outer join, semi join only
(D) inner join, outer join, semi join and anti join

**23.** Which two of the following are equivalent for an undirected graph G ?
(i) G is a tree
(ii) There is at least one path between any two distinct vertices of G
(iii) G contains no cycles and has $(n-1)$ edges
(iv) G has n edges
(A) (i) and (ii)
(B) (i) and (iii)
(C) (i) and (iv)
(D) (ii) and (iii)

**24.** In a B tree of order m with p nodes the average number of splits is at most :
(A) $1/\left(\left\lceil \frac{m}{2} \right\rceil - 1\right)$ (B) $\left(\left\lceil \frac{m}{2} \right\rceil - 1\right)$ (C) $1/\left\lceil \frac{m}{2} \right\rceil$ (D) None

**25.** The propositional formula given by the tree :




is :
(A) $\wedge \vee x_2 \vee x_1 \neg x_1 \neg x_1$ (B) $(x_2 \vee \neg x_2) \wedge (x_1 \vee x_2)$
(C) $(\neg x_1 \vee x_2) \wedge (\neg x_1 \vee x_2)$ (D) None

**26.** Queue is a _____ list.
(A) LIFO (B) LILO (C) FILO (D) FIFO

27. In a full binary tree of height $k$, there are _____ internal nodes.
(A) $2^k - 1$ (B) $2^{k-1}$ (C) $2^k$ (D) $2^k + 1$

28. A binary tree is said to have heap property if the elements along any path :
(A) from leaf to root are non-increasing
(B) from leaf to root are non-decreasing
(C) from root to leaf are non-decreasing
(D) from root to leaf are non-increasing

29. X.25 protocol consists of :
(A) Physical and Frame levels (B) Frame and Packet levels
(C) Physical, Frame and Packet levels (D) None of the above

30. GSM/CDMA systems :
(A) are limited to very low speed data (B) require no local loop wires
(C) are predominantly used for voice (D) all of the above

31. Usually information security in a network is achieved by :
(A) Layering (B) Cryptography
(C) Grade of service (D) None of the above

32 The linker :
(A) is similar to interpreter
(B) uses source code as its input
(C) is required to create a load module
(D) none of the above

33. In which addressing mode the operand is given explicitly in the instruction itself ?
(A) Absolute mode (B) Immediate mode
(C) Indirect mode (D) Index mode

34. A compiler that runs on one machine and produces code for a different machine is called :
(A) Cross compilation (B) One pass compilation
(C) Two pass compilation (D) None of the above

35. Any syntactic construct that can be described by a regular expression can also be described by a :
(A) Context sensitive grammar (B) Non context free grammar
(C) Context free grammar (D) None of the above

**36.** Find the odd man out :

(A) tail (B) cut (C) wart (D) sed

**37.** Which of the following changes permission to deny write permission to group and others ?

(A) Chmod go – w filex (B) Chmod go w filex

(C) Chmod go = w filex (D) None of the above

**38.** Variable partition memory management technique with compaction results in :

(A) Reduction of fragmentation

(B) Minimal wastage

(C) Segment sharing

(D) None of the above

**39.** Capability Maturity Model is meant for :

(A) Product (B) Process

(C) Product and Process (D) None of the above

**40.** In the light of software engineering software consists of :

(A) Programs (B) Data

(C) Documentation (D) All of the above

**41.** Which one of the following ISO standard is used for software process ?

(A) ISO 9000 (B) ISO 9001 (C) ISO 9003 (D) ISO 9000-3

**42.** Which of the following is used for test data generation ?

(A) White Box (B) Black Box

(C) Boundary-value analysis (D) All of the above

**43.** Reverse engineering is the process which deals with :

(A) Size measurement (B) Cost measurement

(C) Design recovery (D) All of the above

**44.** The spacing between character pairs is called :

(A) kerning (B) *x*-height (C) intercap (D) serif

**45.** When compared with analog cellular systems, an advantage of digital TDMA cellular system is that :

(A) it is less complicated

(B) it requires less of computer memory

(C) it conserves spectrum bandwidth

(D) it costs less

**46.** E–commerce includes :

(A) B2C (B) B2B

(C) C2C (D) All of the above

**47.** A clustering technique that permits a convenient graphical display is :

(A) partition based clustering

(B) probabilistic model based clustering

(C) hierarchical clustering

(D) agglomerative clustering

**48.** After sending a message ,the sender should not be able to, at a later date, deny having sent the message, is referred to as :

(A) Authenticity (B) Non–Repudiability

(C) Auditability (D) Repudiability

**49.** The device which connects dissimilar LANs of different topologies using different sets of communication protocols so that information can flow from one to another is called :

(A) Router (B) Bridge (C) Gateway (D) Switch

**50.** We can not delete the _____ icon but we can made it invisible.

(A) Recycle (B) My computer

(C) Internet explorer (D) None of the above

**- o O o -**

**Space For Rough Work**