Test Booklet Code & No.
प्रश्नपत्रिका कोड व क्र. **A**

Paper-II
COMPUTER SCIENCE AND APPLICATION

Signature and Name of Invigilator

1. (Signature) .....

(Name) .....

2. (Signature) .....

(Name) .....

Seat No. | | | | | | |

(In figures as in Admit Card)

Seat No. .....

(In words)

OMR Sheet No. | | | | | | |

(To be filled by the Candidate)

MAY - 37216

Time Allowed : 1¼ Hours] **[Maximum Marks : 100**

Number of Pages in this Booklet : **16** Number of Questions in this Booklet : **50**

Instructions for the Candidates

1. Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
2. This paper consists of **50** objective type questions. Each question will carry *two* marks. *All* questions of Paper-II will be compulsory, covering entire syllabus (including all electives, without options).
3. At the commencement of examination, the question booklet will be given to the student. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as follows :
   (*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 or 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 missing pages/ questions or questions repeated or not in serial order or any other discrepancy should not be accepted and correct booklet should be obtained from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given. The same may please be noted.**
   (*iii*) After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
4. Each question 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 : where (C) is the correct response.

   (A) (B) ● (D)

5. Your responses to the items are to be indicated in the **OMR Sheet given inside the Booklet only.** If you mark at any place other than in the circle in the OMR Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done at the end of this booklet.
8. If you write your Name, Seat 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.
9. You have to return original OMR Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are, however, allowed to carry the Test Booklet and duplicate copy of OMR Sheet on conclusion of examination.
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 for incorrect answers.**

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

1. परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
2. सदर प्रश्नपत्रिकेत **50** बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास **दोन** गुण आहेत. या प्रश्नपत्रिकेतील **सर्व** प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
3. परीक्षा सुरू झाल्यावर विद्यार्थ्याला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून पहाव्यात.
   (*i*) प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
   (*ii*) **पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून पहावी. पृष्ठे कमी असलेली/कमी प्रश्न असलेली/प्रश्नांचा चूकीचा क्रम असलेली किंवा इतर त्रुटी असलेली सदोष प्रश्नपत्रिका सुरुवातीच्या 5 मिनिटातच पर्यवेक्षकाला परत देऊन दुसरी प्रश्नपत्रिका मागवून घ्यावी. त्यानंतर प्रश्नपत्रिका बदलून मिळणार नाही तसेच वेळही वाढवून मिळणार नाही याची कृपया विद्यार्थ्यांनी नोंद घ्यावी.**
   (*iii*) वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
4. प्रत्येक प्रश्नासाठी (A), (B), (C) आणि (D) अशी चार विकल्प उत्तरे दिली आहेत. त्यातील योग्य उत्तराचा रकाना खाली दर्शविल्याप्रमाणे ठळकपणे काळा/निळा करावा.
   उदा. : जर (C) हे योग्य उत्तर असेल तर.

   (A) (B) ● (D)

5. या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे **ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत.** इतर ठिकाणी लिहीलेली उत्तरे तपासली जाणार नाहीत.
6. आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
7. प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
8. जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरीक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूण केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमार्गाचा अवलंब केल्यास विद्यार्थ्याला परीक्षेस अपात्र ठरविण्यात येईल.
9. परीक्षा संपल्यानंतर विद्यार्थ्याने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
10. **फक्त निळ्या किंवा काळ्या बॉल पेनचाच वापर करावा.**
11. **कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
12. **चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

Computer Science and Application

Paper II

Time Allowed : 75 Minutes] **[Maximum Marks : 100**

Note : This paper contains **Fifty (50)** multiple choice questions. Each question carries **Two (2)** marks. Attempt *All* questions.

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

   (A) $R - (Q \cup P) = (R - Q) - P$

   (B) $P - (R \cup Q) = (P - Q) - R$

   (C) $Q - (P \cup R) = (Q - R) - P$

   (D) $P - (Q \cup R) = (P - R) - Q$

2. Let $f : X \rightarrow Y$ and $g : Y \rightarrow Z$. Let $h = g \text{ o } f : X \rightarrow Z$. Suppose g is one-to-one and onto. Which of the following is not *true* ?

   (A) If f is one-to-one then h is one-to-one and onto

   (B) If f is not onto then h is not onto

   (C) If f is not one-to-one then h is not one-to-one

   (D) If f is one-to-one then h is one-to-one

3. Define an equivalence relation R on a set of the positive integers I = {2, 3, 4, ..., 20} by 'a R b' if the largest prime divisor of 'a' is the same as the largest prime divisor of 'b'. The number of equivalence classes of R is :

   (A) 8

   (B) 10

   (C) 9

   (D) 11

4. Which one of the following is *false* ?

   (A) There is unique minimal DFA for every regular language

   (B) Every NFA can be converted to an equivalent PDA

   (C) Complement of every context-free language is recursive

   (D) Every non-deterministic PDA can be converted to an equivalent deterministic PDA

5. Which of the following statements is *true* ?

(A) If a language is context-free it can always be accepted by a deterministic push-down automaton

(B) The union of two context-free languages is context-free

(C) The intersection of two context free languages is context-free

(D) The complement of a context-free language is context-free

6. In octal, the twelve-bit two's complement of the hexadecimal number $2AF_{16}$ is :

(A) 6251_8

(B) 5261_8

(C) 6512_8

(D) 6521_8

7. The truth table for $(a \vee b) \vee (a \wedge c)$ is the same as the truth table for :

(A) $(a \vee b) \wedge (a \vee c)$

(B) $(a \vee b) \wedge c$

(C) $(a \vee b) \wedge (a \wedge c)$

(D) $a \vee b$

8. Which of the following property is true in context of Well-formed-formulae (WFF) ?

(A) Each letter is a term

(B) If x and y are terms then $x = y$ is a formulae

(C) If P is a formulae then 7P is a formulae

(D) All of the above

9. A logic circuit which is used to change a BCD number into an equivalent decimal number is :

(A) Decoder

(B) Encoder

(C) Multiplexer

(D) Demultiplexer

10. Let a_n, a_{n-1}, ..., a_1, a_0 be the binary representation of an integer b. Then b is divisible by 3, if :

(A) number of 1's is divisible by 3

(B) number of 0's is divisible by 3

(C) number of 1's is divisible by 6

(D) difference of alternate sum, i.e. $(a_0 + a_2 + ...) - (a_1 + a_2 + ...)$ is divisible by 3

11. Consider the C function given below :

```
int f(int j)
{
 static int i = 50;
 int k;
 if (i == j)
 {
  printf("something");
  k = f(i);
  return 0;
 }
 else return 0;
}
```

Which one of the following is *true* ?

(A) The function returns 0 for all values of j

(B) The function prints the string something for all values of j

(C) The function returns 0 when j = 50

(D) The function will exhaust the runtime stack or run into an infinite loop when j = 50

12. When does the void pointer in C language get de-referenced ?

(A) when it doesn't point to any value

(B) when it cast to another type of object

(C) using delete keyword

(D) none of the above mentioned

13. What is the meaning of the following declaration ?

int(*m[8])( );

(A) m is pointer to function

(B) m is array of pointer to function

(C) m is pointer to such function which return type is array

(D) m is pointer to array of function

14. What is size of generic pointer in C language ?

(A) 0

(B) 1

(C) 2

(D) Null

15. If new operator is used, then the constructor function is :

(A) Copy constructor

(B) Default constructor

(C) Static constructor

(D) Dynamic constructor

16. What will be the result of statement :

"select * from employee where salary in (4000, 8000)" ?

(A) All employees whose salary is either 4000 or 8000

(B) All employees whose salary is between 4000 and 8000

(C) All employees whose salary is not between 4000 and 8000

(D) None of the above

17. Consider the class schema as follows :

Class(course_id, dept_name, title, credits, sec_id, semster, year, building, room_number, capacity, time_slot_id)

Choose the *correct* decomposition of class schema each of which is in BCNF :

(A) course, class_room, department

(B) course, credits, room

(C) course_id, room_number, building

(D) class_room, room_capacity, building

18. Rollback statement of SQL TCL :

(A) ends the transaction successfully

(B) aborts the database transaction successfully

(C) makes update permanent in the database

(D) all of the above

19. Which of these expresses the number of entities to which another entity can be associated via a relationship set ?

(A) Mapping cardinality

(B) Degree of relationship

(C) Connectivity of relationship

(D) Role

20. Consider R = (A, B, C, G, H, I) and the set F of functional dependancies, F = {A $\rightarrow$ B, A $\rightarrow$ C, CG $\rightarrow$ H, CG $\rightarrow$ I, B $\rightarrow$ H}. The *correct* members of closure of F are :

(A) A $\rightarrow$ H, CG $\rightarrow$ HI, AG $\rightarrow$ I

(B) A $\rightarrow$ HI, CG $\rightarrow$ A

(C) AG $\rightarrow$ BI

(D) A $\rightarrow$ B, B $\rightarrow$ I

21. Which of the following is *not* a kind of data warehouse application ?

(A) Information processing

(B) Analytical processing

(C) Datamining

(D) Transactional processing

22. A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called :

(A) AVL tree

(B) Red-black tree

(C) Lemma tree

(D) Unique tree

23. Two-dimensional array is also called ?

(A) Matrix

(B) Table

(C) Both Matrix and Table

(D) Conjugate Array

24. A binary tree that has n leaf nodes. The number of nodes of degree 2 in this tree is :

(A) $\log_2 n$

(B) $n - 1$

(C) n

(D) 2^n

25. Let $g(x) = x^3 + x + 1$. If the information sequence represented in binary is 1001, then CRC (Cyclic Redundancy Check) is :

(A) 1110

(B) 0110

(C) 0111

(D) 0011

26. Suppose the population of the world is 6 billion on an average there are 1000 communicating devices per person. How many bits are required to assign a unicast host address to each communicating device ?

(A) 43 bits

(B) 53 bits

(C) 40 bits

(D) 47 bits

27. Suppose a user has two browser applications active at the same time, and suppose that the two applications are accessing the same server to retrive HTTP documents at the same time. How does the server tell the difference between the two applications only ?

(A) based on IP address of server

(B) based on client IP address

(C) based on client IP address and dynamic port address

(D) based on ephemeral port address

28. Suppose that the TCP entity receives a 1.5 megabyte file from the application layer and that the IP layer is willing to carry blocks of maximum size 1500 bytes. Calculate the amount of overhead incurved from segmenting the file into pocket-sized units :

(A) 2.0%

(B) 2.8%

(C) 2.1%

(D) 3.0%

29. Suppose all laptops in a large city are to communicate using radio transmissions from a high antenna tower. Which layer is appropriate for communication ?

(A) Network layer

(B) Data link layer

(C) Transport layer

(D) Application layer

30. Consider the SLR(1) and LALR(1) parsing table for a context free grammar. Which of the following statements is *true* ?

(A) The goto part of both tables may be different

(B) The shift entries are identical in both the tables

(C) The reduce entries in the tables may be different

(D) The error entries in the tables may be different

31. In a two-pass assembler, the task of the Pass-II is to :

(A) Separate the symbol, mnemonic opcode and operand fields

(B) Build the symbol table

(C) Construct intermediate code

(D) Synthesize the target program

32. The function of Syntax phase is :

(A) To recognize the major constructs of the language and to call the appropriate action routine

(B) To build a literal table

(C) To build a uniform symbol table

(D) To parse the source program into the basic element or token of the language

33. In 8085 microprocessor, the value of the most significant bit of the result following the execution and any arithmetic or Boolean instruction is stored in the :

(A) carry status flag

(B) auxiliary carry status flag

(C) sign status flag

(D) zero status flag

34. A bottom up parser generates :

(A) Rightmost derivation

(B) Rightmost derivation in reverse

(C) Leftmost derivation

(D) Leftmost derivation in reverse

35. Consider three CPU-intensive processes, which require 10, 20 and 30 time units and arrive at time points 0, 2 and 6, respectively. How many context switches are needed if the operating system implements a shortest remaining time first scheduling algorithm ? Do not count the context switches at time zero and at the end :

(A) 1

(B) 2

(C) 3

(D) 4

36. Critical section is a program segment :

(A) which should run in a certain specified amount of time

(B) which avoids deadlocks

(C) where shared resources are accessed

(D) which must be enclosed by a pair of semaphore operations, P and V

37. Using a larger block size in a fixed block size file system leads to :

(A) better disk throughput but poorer disk space utilization

(B) better disk throughput and better disk space utilization

(C) poorer disk throughput but better disk space utilization

(D) poorer disk throughput and poorer disk space utilization

38. In a system with 32-bit virtual addresses and 1 kB page size, use of one-level page table for virtual to physical address translation is not practical because of :

(A) the large amount of internal fragmentation

(B) the large amount of external fragmentation

(C) the large memory overhead in maintaining page tables

(D) the large computation overhead in the translation process

39. As per the theory of Software Engineering, the good software attributes are :

(A) functionality and documentation

(B) performance and customization

(C) functionality and performance

(D) performance and production

40. The best software engineering techniques and methods are considered to be good that uses :

(A) best development model

(B) best SDLC model

(C) best testing model

(D) different techniques that are appropriate for different types of systems

41. As per the Software Engineering practices, two kinds of Software products are :

(A) Generic and customised

(B) Licensed and open source

(C) General and web-based

(D) Procedural and object-oriented

42. As per the practices of software engineering, the cost of software production is distributed as :

(A) development cost 50% and testing cost 40%

(B) development cost 80% and testing cost 20%

(C) development cost 90% and testing cost 10%

(D) development cost 60% and testing cost 40%

43. Fundamental Software Engineering activities are software :

(A) Specification, development, validation, evolution

(B) Specification, development, validation, production

(C) Performance, development, validation, evolution

(D) Performance, production, validation, evolution

44. The process of removing the deficiencies and loopholes in the data is called as :

(A) Aggregation of data

(B) Extracting of data

(C) Cleaning up of data

(D) Loading of data

45. The type of relationship in star schema is :

(A) Many to many

(B) One to one

(C) One to many

(D) Many to one

46. The full form of OLAP is :

(A) Online Analytical Processing

(B) Online Advanced Processing

(C) Online Advanced Preparation

(D) Online Analytical Performance

47. Which of the following scheme is used to deal with burst errors that occur over multipath and fading channels ?

(A) Intersymbol

(B) Interleaving

(C) Interfading

(D) Intercell

48. Which of the following transmission media uses metal cables to transmit data ?

(A) Fibre optics

(B) Microwaves

(C) Twisted pair

(D) Hybrid pair

49. Speedup of a parallel program is :

(A) Speedup = $\frac{\text{time required for the non-parallel program execution}}{\text{time required for parallel version execution}}$

(B) Speedup = $\frac{\text{time required for the parallel program execution}}{\text{time required for sequential version execution}}$

(C) Speedup = $\frac{\text{time required for the non-parallel program execution}}{\text{time required for heterogeneous program execution}}$

(D) Speedup = $\frac{\text{time required for homogeneous non-parallel program execution}}{\text{time required for heterogeneous program execution}}$

50. Efficiency of a parallel computer lies between :

(A) 0 and 900

(B) 1 and 100

(C) 0 and 100

(D) 0 and 1

ROUGH WORK

ROUGH WORK