Subject Code: 7210/TFU-COMPSC/GLE-III

Question Booklet No. 752258

परीक्षा केन्द्राध्यक्ष की मोहर
Seal of Superintendent of Examination Centre

C.G. SET - 2017
Paper - III
Computer Science and Applications

परीक्षार्थी द्वारा बॉल-प्वाइण्ट पेन से भरा जाए
To be filled in by Candidate by Ball-Point pen only

अनुक्रमांक
Roll No.

उत्तर-शीट का क्रमांक
Sl. No. of Answer-Sheet

घोषणा : मैंने नीचे दिये गये निर्देश अच्छी तरह पढ़कर समझ लिए हैं।
Declaration : I have read and understood the instructions given below.

वीक्षक के हस्ताक्षर
(Signature of Invigilator).....

वीक्षक के नाम
(Name of Invigilator) .....

अभ्यर्थी के हस्ताक्षर
(Signature of Candidate).....

अभ्यर्थी का नाम
(Name of Candidate) .....

Paper : III **Subject : COMPUTER SCIENCE AND APPLICATIONS** **Time : 2 Hour 30 Minutes** **Maximum Marks : 150**

इस प्रश्न-पुस्तिका में पृष्ठों की संख्या
Number of Pages in this Question Booklet } **24**

इस प्रश्न-पुस्तिका में प्रश्नों की संख्या
Number of Questions in this Question Booklet } **75**

INSTRUCTION TO CANDIDATES

1. Immediately after getting the Booklet read instructions carefully, mentioned on the front and back page of the Question Booklet and do not open the seal given on the right hand side, unless asked by the invigilator. Do not accept a booklet without sticker-seal and do not accept an open booklet. As soon as you are instructed to open the booklet in the first 5 minutes you should compulsorily 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 within 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
2. Write your Roll No., Answer-Sheet No., in the specified places given above and put your signature.
3. Make all entries in the OMR Answer-Sheet as per the given instructions, otherwise Answer-Sheet will not be evaluated.
4. For each question in the Question Booklet choose only one correct/most appropriate answer, out of four options given and darken the circle provided against that option in the OMR Answer-Sheet, bearing the same serial number of the question. Darken the circle with **Black or Blue ball-point pen** only.
5. Darken the circle of chosen option fully, otherwise answers will not be evaluated.

   Example : (A) ● (C) (D) **If (B) is correct answer.**
6. There are 75 objective type questions in this Booklet. All questions are compulsory and carry 2 marks each.
7. Do not write anything anywhere in the Question Booklet or on the Answer-Sheet except making entries in the specified places. Rough work is to be done in the space provided in this booklet.
8. When the examination is over, original OMR Answer Sheet is to be handed over to the invigilator before leaving the examination hall, while the Question Booklet and carbon copy of the Answer-Sheet can be retained by the candidate.
9. There is no negative marks for incorrect answer.
10. Use of any calculator/log table/mobile phone is prohibited.

अभ्यर्थियों के लिए निर्देश

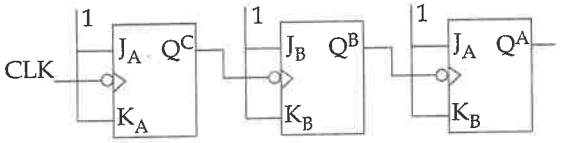
1. प्रश्न-पुस्तिका मिलते ही मुख पृष्ठ एवं अंतिम पृष्ठ में दिए गए निर्देशों को अच्छी तरह पढ़ लें। दाहिनी ओर लगी सील को वीक्षक के कहने से पूर्व न खोलें। स्टीकर सील के बगैर प्रश्न पुस्तिका या खुले हुये प्रश्न पुस्तिका को स्वीकार न करें। प्रश्न पुस्तिका को खोलने के लिए जैसा ही कहा जायेगा प्रथम 5 मिनिट में अनिवार्यत: मुख पृष्ठ पर अंकित पृष्ठों की संख्या एवं प्रश्नों की संख्या को पुस्तिका में पृष्ठों की संख्या एवं प्रश्नों की संख्या से मिलान कर लेवें। पृष्ठों/प्रश्नों का छूटना या पुन: मुद्रित हो जाना या क्रम में नहीं रहना या अन्य किसी विरोधाभास के कारण प्राप्त त्रुटिपूर्ण प्रश्न पुस्तिका को इन्हीं 5 मिनिट के अंदर बदलवा लेवें। इसके पश्चात न ही प्रश्न पुस्तिका बदला जा सकता है और न ही कोई अतिरिक्त समय दिया जायेगा।
2. ऊपर दिए हुए निर्धारित स्थानों में अपना अनुक्रमांक, उत्तर-पुस्तिका का क्रमांक लिखें तथा अपने हस्ताक्षर करें।
3. ओ.एम.आर. उत्तर-शीट में समस्त प्रविष्टियां दिये गये निर्देशानुसार करें अन्यथा उत्तर-शीट का मूल्यांकन नहीं किया जाएगा।
4. प्रत्येक प्रश्न के उत्तर हेतु प्रश्न-पुस्तिका में प्रश्न के नीचे दिए गए चार विकल्पों में से सही/सबसे उपयुक्त केवल एक ही विकल्प का चयन कर ओ.एम.आर. उत्तर-शीट में उसी विकल्प वाले गोले को, जो उस प्रश्न के सरल क्रमांक से सम्बंधित हो, **काले या नीले बॉल-प्वाइण्ट पेन** से भरें।
5. सही उत्तर वाले गोले को अच्छी तरह से भरें, अन्यथा उत्तरों का मूल्यांकन नहीं होगा।

   उदाहरण : (A) ● (C) (D) **यदि (B) उत्तर सही है।**
6. प्रश्न-पुस्तिका में 75 वस्तुनिष्ठ प्रश्न दिए गए हैं। प्रत्येक प्रश्न के लिए 2 अंक निर्धारित है। सभी प्रश्न अनिवार्य है।
7. प्रश्न-पुस्तिका तथा उत्तर-शीट में निर्दिष्ट स्थानों पर प्रविष्टियां भरने के अतिरिक्त कहीं भी कुछ न लिखें। रफ कार्य, इस पुस्तिका में उपलब्ध स्थान पर करें।
8. परीक्षा समाप्ति के उपरान्त तथा कक्ष छोड़ने के पूर्व मूल ओ.एम.आर. उत्तर-शीट वीक्षक को सौंपा जाए। प्रश्न-पुस्तिका एवं उत्तर-शीट की कार्बन कॉपी परीक्षार्थी अपने साथ ले जा सकते हैं।
9. ऋणात्मक मूल्यांकन नहीं किया जावेगा।
10. किसी भी तरह के कैलकुलेटर/लॉग टेबल/मोबाइल फोन का प्रयोग वर्जित है।

SPACE FOR ROUGH WORK / रफ कार्य के लिये जगह

COMPUTER SCIENCE AND APPLICATIONS - III

1. Determine the modulus of the following :



(A) Synchronous mod 8 down counter

(B) Synchronous mod 8 up counter

(C) Asynchronous mod 8 up counter

(D) Asynchronous mod 8 down counter

2. Match the following :

List-I	List-II
(a) mov A,B	(i) Math co-processor
(b) 8059	(ii) Substract instruction
(c) 8087	(iii) Interrupt controller
(d) SUB A,C	(iv) Register to register transfer
(e) 8085	(v) 8-bit Microprocessor

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(iii)	(iv)	(ii)	(v)	(i)
(B)	(iv)	(iii)	(i)	(ii)	(v)
(C)	(i)	(iv)	(iii)	(ii)	(v)
(D)	(v)	(ii)	(i)	(iii)	(iv)

3. Which of the following statement is **not correct** ?

(a) We can transfer register to immediate number.

(b) We can multiply 8-bit three register in one instruction.

(c) 8051 is used for parallel port interface.

(d) We can add two immediate numbers using only one ADD instruction.

Codes :

(A) (c) and (d)

(B) (a) and (b)

(C) (a), (b), (c) and (d)

(D) (a), (b) and (d)

4. How many I/O devices can be interfaced to 8085 Microprocessor using I/O mapped technique ?

(A) Either 256 input devices or 256 output devices

(B) Either 512 input devices or 512 output devices

(C) 256 input devices and 256 output devices

(D) 512 input devices and 256 output devices

SPACE FOR ROUGH WORK / रफ कार्य के लिये जगह

5. The main difference between combinational logic circuit and digital sequential logic circuit is :

(A) Combinational circuits have no memory and sequential digital logic circuits have memory

(B) Combinational circuits have memory and sequential digital logic circuits have no memory

(C) Combinational circuits have feed-back sequential digital circuits have no feed-back

(D) Combinational circuits have memory and feed-back and sequential digital circuits have no memory and no feed-back

6. A computer with a 32-bit wide data bus uses 4k*8 static RAM chips. The smallest memory this computer can have :

(A) 32 kb

(B) 16 kb

(C) 8 kb

(D) 24 kb

7. Match the following :

(a)	3NF	(i)	Functional dependency
(b)	BCNF	(ii)	Multivalued dependency
(c)	4NF	(iii)	Join dependency
(d)	5NF		

Codes :

	(a)	(b)	(c)	(d)
(A)	(i)	(ii)	(iii)	(i)
(B)	(i)	(i)	(iii)	(ii)
(C)	(i)	(ii)	(iii)	(ii)
(D)	(i)	(i)	(ii)	(iii)

8. Which are correct statements for original purposes of the SQL standards ?

(a) To specify the syntax and semantics of SQL data definition and manipulation language.

(b) To define the data structure and basic operations for designing, accessing, maintaining, controlling, and protecting an SQL database.

(c) To provide a vehicle for probability of database definition and application modules between conforming DBMSs.

Codes :

(A) (a) and (b)

(B) (a) and (c)

(C) (a), (b) and (c)

(D) (b) and (c)

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9. Match the following :

List-I	List-II
(a) Data structure	(i) Operations used to manipulate data
(b) Data manipulation	(ii) Maintain the integrity among data
(c) Data integrity	(iii) Store and retrieve row of data in relation
(d) Relational keys	(iv) Primary key that consist of more than one attributes
(e) Composite key	(v) Organized in the form of table with rows and columns

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(v)	(i)	(ii)	(iii)	(iv)
(B)	(i)	(ii)	(iii)	(iv)	(v)
(C)	(ii)	(iii)	(iv)	(v)	(i)
(D)	(iii)	(iv)	(v)	(i)	(ii)

10. Match the following inference Axioms :

List-I **Inference**	List-II **Name of axiom**
(a) $X \rightarrow Y$, then $XW \rightarrow Y$	(i) Union
(b) $X \rightarrow Z$ and $X \rightarrow Y$ then $X \rightarrow YZ$	(ii) Pseudotransitivity
(c) $X \rightarrow Y$ and $YW \rightarrow Z$ then $XW \rightarrow Z$	(iii) Projectivity
(d) $X \rightarrow YZ$, $X \rightarrow Y$ then $X \rightarrow Z$	(iv) Augmentation

Codes :

	(a)	(b)	(c)	(d)
(A)	(iv)	(iii)	(ii)	(i)
(B)	(ii)	(iv)	(i)	(iii)
(C)	(iii)	(ii)	(iv)	(i)
(D)	None of these			

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11. Consider the following schema :
employee (person_name, street, city)
works (person_name, company_name, salary)
company (company_name, city).
The relational algebraic expression for the query "names of all employees who live in the same city as the company for which they work" is :

(A) $\pi_{\text{person-name}}$ (employee $\bowtie$ works $\bowtie$ company)

(B) $\pi_{\text{person-name}}$(employee $\bowtie$ works $\bowtie$ company)

(C) $\pi_{\text{person-name}}$ (employee $\bowtie$ works $\bowtie$ company)

(D) $\pi_{\text{person-name}}$(employee $\bowtie$ works $\bowtie$ company)

12. In bresenhan's algorithm error term is initialized to :

(A) 1

(B) $-\frac{1}{2}$

(C) 0

(D) None of the above

13. The process of blending audio data with video data and other data for synchronization is known as :

(A) Bit-mapping

(B) Interleaving

(C) Inter-processing

(D) Eye-dropping

14. Are the following vectors are linearly independent ?

$\{[1,2]^T, [2,4]^T\}$.

(A) Linearly Independent

(B) Linearly Dependent

(C) Insufficient Data

(D) None of these

15. The parametric equation of a parabola is :

(A) $x = at^2$
$y = 2at$

(B) $x = r \cos t$
$y = r \sin t$

(C) $x = r \sin t$
$y = r \cos t$

(D) $x = r$
$y = \theta$

16. The process of digitizing a given picture definition into a set of pixel-intensity for storage in the frame buffer is called :

(A) Rasterization

(B) Encoding

(C) True color system

(D) Scan conversion

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17. What is the output of the functional programming LISP by func :

```
(Setq L1 '(1 2 3))

(Defun func (L1)

  (Setq T1 L1)

  (Let N (Length (T1))

    (Do

      (( ×1 (+ ×1))

       ((Sum 0 (+ sum (* ((car T1))))

          (Setq T1 (cdr T1))

          ((Equal N × ) sum )))

          ((Prime (/sum N)))
```

(A) 6

(B) 2

(C) 1

(D) 14

18. What will be the output of the following program ?

```
#include<stdio.h>
    int main()
    {
    int i = 2;
    switch(i)
    {
       case 1 :
         printf("I am in case 1\n");
       case 2 :
         printf("I am in case 2\n");
       case 3 :
         printf("I am in case 3\n");
       default :
         printf("I am in default\n");
    }
    return 0;
}
```

(A) I am in case 2
I am in case 3
I am in default

(B) I am in case 1
I am in case 2
I am in case 3
I am in default

(C) I am in case 2

(D) I am in default

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19. Which of the following are ambiguous grammar ?

(a) $E \rightarrow E+T|T$

(b) $A \rightarrow A\ (A)|\epsilon$

(c) $E \rightarrow E+E|EE|E*|id$

(d) $A \rightarrow AA|(A)|a$

(A) (c) and (d)

(B) (a) and (c)

(C) (b) and (d)

(D) (a) and (b)

20. What is the output of the program ?

```
# include < stdio.h >

int main()

{

int J=6, Y;

    Y=++J + ++J + ++J;

     printf(%5D Y), return 0;

}
```

(A) 24

(B) 21

(C) 27

(D) 18

21. Consider the following grammar :

$S \rightarrow Ax/By$

$A \rightarrow By/Cw$

$B \rightarrow x/Bw$

$C \rightarrow y$

Which of the regular expressions describe the same set of strings as the grammar ?

(A) $xw*y+xw*yx+ywx$

(B) $xwy+xw*xy+ywx$

(C) $xw*y+xwxyx+ywx$

(D) $xwxy+xww*y+ywx$

22. Assume a sender sends 6 packets : packets 0, 1, 2, 3, 4 and 5. The sender receives an ACK with ACK No. = 3. What is the interpretation if the system is using GBN or SR ?

(a) If the system is using GBN, it means that packets 0, 1 and 2 have been received uncorrupted and the receiver is expecting packet 3.

(b) If the system is using SR, it means that packet 3 has been received uncorrupted, the ACK does not say anything about other packets.

(c) In case of GBN no output system goes into infinite loop.

(d) In case of SR system will be interrupted and terminate the further communication.

Codes :

(A) (a) and (b)

(B) (c)

(C) (d)

(D) (c) and (d)

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23. Match the following :

(a)	analog data	(i)	Discrete values
(b)	digital data	(ii)	Changes without exhibiting a pattern
(c)	Periodic analog signals	(iii)	Cannot be decomposed into simple signals
(d)	Non periodic analog signals	(iv)	Pattern within measurable time frame
(e)	Sine wave	(v)	Information that is continuous

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(i)	(iii)	(iv)	(ii)	(v)
(B)	(v)	(iii)	(iv)	(i)	(ii)
(C)	(ii)	(iv)	(v)	(iii)	(i)
(D)	(v)	(ii)	(iv)	(i)	(iii)

24. IP Security (IPSec) is a collection of protocols designed by IETF. Which of the following is **not** true about IPSec ?

(A) It operates in transport or tunnel mode

(B) It provides security for a packet at the network level

(C) It defines two protocols AH and ESP

(D) It uses Alert protocol for reporting errors and abnormal conditions.

25. A client process 'P' needs to make a TCP connection to a server process 'S' executing socket( ), bind( ) and listen( ) in order. Subsequently P executes a socket( ), connect( ) to S but 'S' has not executed any accept( ) system call. Which of the following events will occur ?

(a) Connect( ) system call returns successfully

(b) Connect( ) system call blocks

(c) Connect( ) system call return error

(d) No event occurs

Codes :

(A) (a), (b)

(B) (d)

(C) (b), (c)

(D) (b)

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26. We have four sources each creating 250 characters per second. If the inter leaved unit is a character and 1 synchronizing bit is added to each frame, then how many number of bits in each frame ?

(A) 17

(B) 33

(C) 65

(D) 129

27. User datagram protocol is connectionless because :

(A) All UDP packets are treated independently by transport layer

(B) It sends data as a stream of related packets

(C) Both (A) and (B)

(D) None of the above

28. Match the following design strategy with the problem domain :

	Design Strategy		**Problem Domain**
(a)	Divide and Conquer	(i)	Connected Component
(b)	Greedy Method	(ii)	0/1 Knap Sack problem
(c)	Dynamic Programming	(iii)	Artificial Intelligence
(d)	Back Tracking	(iv)	Heap tree

Codes :

	(a)	**(b)**	**(c)**	**(d)**
(A)	(iii)	(iv)	(i)	(ii)
(B)	(ii)	(iii)	(iv)	(i)
(C)	(iv)	(i)	(ii)	(iii)

(D) None of these

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29. The optimal feasible solution of the following L.P. problem is

Maximize $Z = 6x_1 + 4x_2$

Subject to $2x_1 + 3x_2 \leq 30$

$3x_1 + 2x_2 \leq 24$

$x_1 + x_2 \geq 3$

$x_1, x_2 \geq 0$

(A) $x_1 = 0,\ y_1 = 8,\ Z = 32$

(B) $x_1 = 4,\ y_1 = 4,\ Z = 40$

(C) $x_1 = 8,\ y_1 = 0,\ Z = 48$

(D) $x_1 = 4,\ y_1 = 6,\ Z = 56$

30. A connected planar graph with n vertices and e edges has :

(A) (n − e + 2) regions

(B) (e − n + 2) regions

(C) (e + n − 2) regions

(D) (e + n + 2) regions

31. Compile time polymorphism is achieved by :

(A) Function overloading

(B) Operator overloading

(C) Virtual function

(D) Both (A) and (B)

32. Which of the following is **correct** ?

(a) Member function can be defined inside and outside of the class

(b) Member function can only defined inside of the class

(c) Member function can only defined outside of the class

(d) Member function neither defined inside nor outside of the class

(A) (b) and (c)

(B) (d)

(C) (b)

(D) (a)

33. A pointer to an object is created inside a class in :

(A) Aggregation

(B) Composition

(C) Inheritance

(D) Association

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34. Runtime Polymorphism is achieved by :

(A) Function overloading

(B) Operator overloading

(C) Virtual function

(D) Friend function

35. Which of the following operator can not be overloaded ?

(A) + +

(B) ( )

(C) ~

(D) : :

36. The reason for which Software Requirement Specifications (SRS) can change and there by making software development a hard task

(a) Change in Business logic

(b) Change in Technology

(c) Change in Employee structure

Codes :

(A) (a) and (b)

(B) (b) and (c)

(C) (a) and (c)

(D) All of (a), (b) and (c)

37. Match the following for software engineering estimation :

(i) ORGANIC	(i) $3.0(KLOC)^{1.12}$	(i) $2.5(effort)^{0.38}$
(ii) SEMI-DETACHED	(ii) $3.6(KLOC)^{1.20}$	(ii) $2.5(effort)^{0.32}$
(iii) EMBEDDED	(iii) $2.4(KLOC)^{1.05}$	(iii) $2.5(effort)^{0.35}$

(A) (i) - (ii) - (iii),
(ii) -(iii) - (i)

(B) (i) - (iii) - (i),
(ii) -(i) - (ii)

(C) (i) - (iii) - (ii),
(ii) -(i) - (iii)

(D) (i) - (iii) - (i),
(iii) -(ii) - (ii)

38. For small relatively simple project the task set for requirements gathering might look like this :

(a) Make a list of stakeholders for the project

(b) Invite all the stakeholders to an informal meeting

(c) Ask each stakeholders to make a list of features and functions required

(d) Discuss requirements and build a final list

(e) Prioritize requirements

Codes :

(A) (a), (b) and (d)

(B) (a), (b), (c), (d) and (e)

(C) (b) and (e)

(D) (a), (d) and (e)

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39. Match the following :

List-I		List-II
(a) Scenario based models	(i)	That represents object oriented classes
(b) Data models	(ii)	Represents functional elements of the system
(c) Class-oriented models	(iii)	That depict how the software behaves as a consequence of external events
(d) Flow-oriented models	(iv)	That depicts the information domain for the problem
(e) Behavioural models	(v)	Requirements from the point of view of various system

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(i)	(ii)	(iii)	(iv)	(v)
(B)	(ii)	(iii)	(iv)	(v)	(i)
(C)	(iii)	(iv)	(v)	(i)	(ii)
(D)	(v)	(iv)	(i)	(ii)	(iii)

40. Which two of the following models will not be able to give the desired outcome if user's participation is not involved ?

(A) Waterfall and Spiral

(B) RAD and Spiral

(C) RAD and Waterfall

(D) RAD and Prototyping

41. Assume a CPU takes 16 cycles to execute an instruction in worst case.

Number of cycles required to execute current instruction by the CPU is 12. If an interrupt occurs while executing current instruction then after how many cycles it will be recognised ?

(A) 16

(B) 12

(C) $16 + 12$

(D) $16 - 12$

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42. Match column **A** with **B** :

A		B	
(a)	A login program	(i)	Identification
(b)	Logging all logins and logouts	(ii)	Prevention
(c)	Weekly backup	(iii)	Correction
(d)	Promptly deleting unused accounts	(iv)	Authentication

Codes :

	(a)	(b)	(c)	(d)
(A)	(i)	(iii)	(iv)	(ii)
(B)	(ii)	(iv)	(iii)	(i)
(C)	(iv)	(ii)	(i)	(iii)

(D) None of these

43. The dead lock detection algorithm can be applied to detect the deadlocks if :

(A) If the resource graph does not contain any circuit

(B) If the resource graph contains at the most one circuit

(C) If the resource graph contains exactly one circuit

(D) If the resource graph contains any no. of circuits

44. Suppose a memory system contains the cache, main memory and virtual memory access times of which are 5 nanoseconds, 100 nanoseconds and 10 milliseconds respectively. If the cache hit rate is 0.8 and main memory hit rate is 0.995, then what is the average memory access time ?

(A) 10024 ns

(B) 100024 ns

(C) 124 ns

(D) 1024 ns

45. A CPU has 32-bit memory address and each word has size of 1 byte. Block size is 16 bytes. The size of cache memory is 256 kB. The cache is organised as a 4-way set associative manner. What is the total amount of extra memory (in bytes) required for the tag bits ?

(A) 2^{20}

(B) 2^{15}

(C) 2^{32}

(D) 2^{24}

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46. An inferencing rule that says if you know falsity of conclusion you can infer about falsity of premise , e.g. ,

$$\frac{\neg q \quad p \rightarrow q}{\neg p}$$

The rule is :

(A) Modus ponens

(B) GMP

(C) Modus tollens

(D) Chain rule

47. If A^* algorithm is augmented to include the provision for deleting revisited states. Which of the following is not TRUE regarding completeness ?

(A) Potential loss of optimality

(B) Shorter and larger paths are possible

(C) Thrashing

(D) Infinite loops are possible

48. Match all items in **Group-I** with the correct option from those given in **Group-II** :

Group-I	Group-II
(a) Regular Expression	(i) Syntax Analysis
(b) Pushdown Automation	(ii) Code Generation
(c) Dataflow Analysis	(iii) Lexical Analysis
(d) Register Allocation	(iv) Code Optimization

Codes :

	(a)	(b)	(c)	(d)
(A)	(i)	(ii)	(iii)	(iv)
(B)	(iii)	(i)	(iv)	(ii)
(C)	(ii)	(iii)	(iv)	(i)
(D)	(iv)	(iii)	(ii)	(i)

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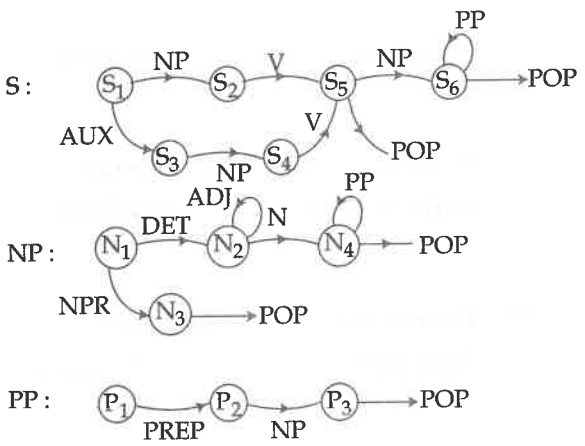
49. Consider the following nets. State which of the following is correct statement.



(A) It is representing Recursive Transition Net (RTN)

(B) It is representing Non Recursive Transition Net (NRTN)

(C) It is representing Augmented Transition Net (ATN)

(D) It is representing Non Augmented Transition Net (NATN)

50. For two events H and E the conditional probability of event H, given that the event E has occurred is defined as :

(A) $P(H/E) = P(H \& E)/P(E)$

(B) $P(E/H) = P(H \& E)/P(E)$

(C) $P(H, E) = P(H \& E)/P(E)$

(D) None of the above

51. In a group of persons travelling in a bus, 6 persons can speak Tamil, 15 can speak Hindi and 6 can speak English. In that group none can speak any other language. If 2 persons in the group can speak in two languages and only one can speak in all three languages, then what is the group size ?

(A) 27

(B) 22

(C) 23

(D) 24

52. Consider the following experiment :

Step 1 : Flip a fair coin twice.

Step 2 : If the outcomes are (Tail, Head) then output Y and stop.

Step 3 : If the outcomes are either (Head, Head) or (Head, Tail) then output N and stop.

Step 4 : If the outcomes are (Tail, Tail) then goto step1.

What is the probability that the output of the experiment in Y ?

(A) 0.25

(B) 0.31

(C) 0.06

(D) 0.5

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53. The preorder traversal sequence of a binary search tree is 30, 20, 10, 15, 25, 23, 39, 35, 42 which one of the following is the post order traversal sequence of the same tree ?

(A) 10, 20, 15, 23, 25, 35, 42, 39, 30

(B) 15, 10, 25, 23, 20, 42, 35, 39, 30

(C) 15, 20, 10, 23, 25, 42, 35, 39, 30

(D) 15, 10, 23, 25, 20, 35, 42, 39, 30

54. A RAM chip has a capacity of 1024 words of 8 bits each (1K×8). Number of RAM chips and the number of 2×4 decoders with enable input required to construct 16K×16 RAM are respectively :

(A) 16 and 4

(B) 32 and 5

(C) 32 and 4

(D) 16 and 5

55. Consider an instruction pipeline with five stages without any branch prediction: Fetch Instruction (FI), Decode Instruction (DI), Fetch Operand (FO), Execute Instruction (EI) and Write Operand (WO). The stage delays for FI, DI, FO, EI and WO are 5ns, 7ns, 10ns, 8ns and 6ns respectively. There are intermediate storage buffers after each stage and the delay of each buffer is 1ns. A program consisting of 12 instructions $I_1, I_2, I_3, \ldots\ldots\ldots I_{12}$ is executed the pipeline processor. Instruction I_4 is the only branch instruction and its branch target is I_9. If the branch is taken during the execution of this program, the time (in ns) needed to complete the program is :

(A) 132 ns

(B) 165 ns

(C) 176 ns

(D) 330 ns

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56. In the following truth table V = 1 if and only if the input is valid :

Inputs				Outputs		
D_0	D_1	D_2	D_3	X_0	X_1	V
0	0	0	0	X	X	0
1	0	0	0	0	0	1
X	1	0	0	0	1	1
X	X	1	0	1	0	1
X	X	X	1	1	1	1

What function does the truth table represent ?

(A) Priority encoder

(B) Decoder

(C) Demultiplexer

(D) Multiplexer

57. An IPV4 network is specified as 210·212·4.0/29. What would be the network of this network ?

(A) 255·255·255.248

(B) 255·255·255.252

(C) 255·255·255.226

(D) 255·255·255.29

58. Consider the following relation schema pertaining to a student database :

Student (roll no., name , address)

Enroll (roll no., course no., course name)

where the primary keys are shown underlined. The number of tuples in the Student and Enroll tables are 240 and 16 respectively. What would be the maximum and minimum number of tuples that can be present in (Student∗Enroll) where '∗' denotes natural join.

(A) 240, 240

(B) 240, 16

(C) 3840, 240

(D) 3840, 16

59. What will be the number of elements in left-subtree and right-subtree of a heap if following elements are inserted in order 45, 26, 84, 63, 27, 94, 47 ?

(A) 4, 2

(B) 2, 4

(C) 4, 3

(D) 3, 3

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60. Ram and Shyamal have been asked to show that a certain problem π is NP-complete. Ram shows a polynomial time reduction from the 3 - SAT problem to π and Shyamal shows a polynomial time reduction from π to 3 - SAT. Which of the following can be inferred from the Reduction ?

(A) π is NP - complete

(B) π is NP- hard but not NP - complete

(C) π is NP but not NP - complete

(D) π is neither NP - hard, nor is NP

61. Match the following :

	List-I		List-II
(a)	Negation	(i)	$\neg P$
(b)	Conjunction	(ii)	$P \vee Q$
(c)	Disjunction	(iii)	$P \Rightarrow Q$
(d)	Implication	(iv)	$P \Leftrightarrow Q$
(e)	If and only if	(v)	$P \wedge Q$

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(i)	(v)	(ii)	(iii)	(iv)
(B)	(i)	(ii)	(iii)	(iv)	(v)
(C)	(ii)	(iii)	(iv)	(v)	(i)
(D)	(iii)	(iv)	(v)	(i)	(ii)

62. Consider the Languages :

$L_1 = \{ww^R / w \in \{0, 1\}^*\}$

$L_2 = \{w\#w^R / w \in \{0, 1\}^*\}$ (where # is a special symbol)

$L_3 = \{ww / w \in \{0, 1\}^*\}$

Which one of the following is true ?

(A) L_1 is a deterministic CFL

(B) L_2 is a deterministic CFL

(C) L_3 is a CFL, but not a deterministic CFL

(D) L_3 is a deterministic CFL

63. Bit error rate (ber) in data transmission usually relates to :

(A) Signal transmission failures

(B) Signal receiver failure

(C) Signal noise measure

(D) Poor S/N ratio

64. The fourier transform of one impulse train is also another impulse train with period of the output equal to the :

(A) Period of the input

(B) Half the period of input

(C) Twice the period of the input

(D) Reciprocal of the period of input signal

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65. The method using which the error propagation in dubinary signalling can be avoided is :

(A) Filtering

(B) Precoding

(C) Postcoding

(D) None of the above

66. The transfer function of the Gaussian highpass filter with cutoff frequency locus at a distance D_0 from the origin is given by :

(A) $H(u, v) = \begin{cases} 0 \text{ if } D(u, v) \leq D_0 \\ 1 \text{ if } D(u, v) > D_0 \end{cases}$

(B) $H(u, v) = \dfrac{1}{1 + [D_0/D(u, v)]^{2n}}$

(C) $H(u, v) = 1 - e^{-D^2(u, v)/2D_0^2}$

(D) None of these

67. Transportation and assignment problems are linear programming techniques called :

(A) Supply demand problems

(B) Source destination problems

(C) Network flow problems

(D) Hungarian problems

68. If Dijkstra's shortest path algorithm is implemented on unweighted graph to run in linear time, which of the following data structure will be used ?

(A) Queue

(B) Stack

(C) Heap

(D) Tree

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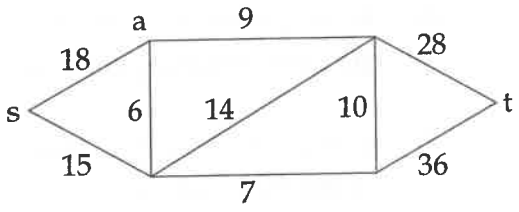
69. What is the shortest path using the Dijkstra algorithm for the problem ?



(A) s c a b t

(B) s c b t

(C) s a b t

(D) s c d t

70. For a crisp set X, the fuzzy relation I on X * X is defined by,

$$\mu_I(x, y) = \begin{cases} 1 & x = y \\ 0 & x \# y \end{cases}$$

is called :

(A) Unit fuzzy function on Y, denoted by I_Y

(B) Unit fuzzy function on X, denoted by I_X

(C) Binary fuzzy function of X on Y, denoted by $I_{X,Y}$

(D) None of the above

71. Match the following :

List-I	List-II
(a) Hetero associative	(i) a set of input pattern is divided into a number of classes
(b) Auto associative	(ii) when it sensible interprets input pattern that are new to the network
(c) Classification	(iii) distinct cause-effect relationship
(d) Generalize neural network	(iv) if the network is presented with a pattern similar to a member of the stored set
(e) Learning	(v) association between pair of pattern

Codes :

	(a)	(b)	(c)	(d)	(e)
(A)	(i)	(ii)	(iii)	(iv)	(v)
(B)	(v)	(iv)	(i)	(ii)	(iii)
(C)	(ii)	(iii)	(iv)	(v)	(i)
(D)	(iii)	(iv)	(v)	(i)	(ii)

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72. Which of the following sequence of steps to be taken in designing a fuzzy logic Machine ?

(A) Fuzzification → Rule Evaluation → Defuzzification

(B) Fuzzification → Defuzzification → Rule Evaluation

(C) Defuzzification → Rule Evaluation → Fuzzification

(D) Rule Evaluation → Fuzzification → Defuzzification

73. Which of the following is false about pipe in Unix ?

(A) It is a one way communication channel

(B) It dies along with process that created it

(C) It can not be shared by unrelated process

(D) It is used for direct memory access data transfer

74. In Bresenham's circle algorithm a circle is generated by :

(A) First generate one octant and generate others by reflection

(B) Calculate along the line of pixel centre by rotation

(C) First generate one octant and generate others by rotation

(D) First generate one octant and generate others by translation

75. The Win 32 library provides two classes for creating the main window. These are :

(A) WINMAIN and WINCLASS

(B) WNDCLASS and WNDCLASSX

(C) WINBASE and WINNT

(D) None of the above

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SEAL

उत्तर अंकित करने का समय : 2 घंटा 30 मिनिट
Time for marking answers : 2 Hour 30 Minutes

अधिकतम अंक : 150
Maximum Marks : 150

नोट :

1. इस प्रश्न-पुस्तिका में 75 प्रश्न है - प्रत्येक प्रश्न 2 अंक का है। सभी प्रश्न हल करना अनिवार्य है।

2. प्रश्नों के उत्तर, दी गई OMR उत्तर-शीट (आंसर-शीट) पर अंकित कीजिए।

3. ऋणात्मक मूल्यांकन नहीं किया जावेगा।

4. किसी भी तरह के कैलकुलेटर या लॉग टेबल एवं मोबाइल फोन का प्रयोग वर्जित है।

5. OMR उत्तर-शीट (आंसर-शीट) का प्रयोग करते समय ऐसी कोई असावधानी न करें/बरतें जिससे यह फट जाये या उसमें मोड़ या सिलवट आदि पड़ जाये जिसके फलस्वरूप वह खराब हो जाये।

Note :

1. This Question Booklet contains 75 questions. Each question carries 2 marks. Answer all questions.

2. Indicate your answers on the OMR Answer-Sheet provided.

3. No negative marking will be done.

4. Use of any type of calculator or log table and mobile phone is prohibited.

5. While using OMR Answer-sheet care should be taken so that the Answer-sheet does not get torn or spoiled due to folds and wrinkles.

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