### Signature and Name of Invigilator

1.	(Signature)			OMR	R Sheet	t <b>No. :</b>	(To be fi	lled by	the Ca	ndida	ate)
	(Name)			Roll							
2. (Signature)				10111		(In fig	gures as	per adm	vission	card	
	(Name) PAPEI	R _	тт	Roll	No	(	Sur co uo	per uun		cui u	)
N	<b>J 0 8 7 1 7</b> COMPUTER S					)	(In	words)			
Ti					MNL	,	[May	kimum	Mar	·ke ·	150
					mbor	of Or	iestion		-	_	
<u> </u>	umber of Pages in this Booklet : 20 Instructions for the Candidates	-		INU		-			is doc	Kiet	. 75
1	Write your roll number in the space provided on the top of			,			के लिए		1	.)	
1.	this page.		-				भपना रोल		खए।	ć.	
2.	This paper consists of seventy five multiple-choice type of					-	न्पीय प्रश्न न			<u> </u>	- <del></del>
3.	questions. At the commencement of examination, the question booklet						का आपको 11 उसकी f				
	will be given to you. In the first 5 minutes, you are requested						रय करनी है		<b>u</b> - <b>u</b> - <b>i</b>	17 101	<u>, ,, ,</u>
	<ul><li>to open the booklet and compulsorily examine it as below :</li><li>(i) To have access to the Question Booklet, tear off the</li></ul>		(i) 3	प्रश्न-पुस्ति	ाका खोल	तने के लि	गए पुस्तिक	ा पर लगी	कागज	की सी	ोल को
	paper seal on the edge of this cover page. Do not accept		100			· · · · · · · · · · · · · · · · · · ·	स्टीकर-र्स	-			
	a booklet without sticker-seal and do not accept an open booklet.	1					सार प्रश्न- 				
	(ii) Tally the number of pages and number of questions in	1					कर लें वि त दुबारा अ				
	the booklet with the information printed on the cover	1					ा पुजारा उ ती त्रुटिपूर्ण				
	page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other	p.	3	उसी समय	। उसे लौत	टाकर उस	कि स्थान प	गर दूसरी स	नही प्रश्न	-पुस्ति	ाका ले
	discrepancy should be got replaced immediately by a	<b>_</b>					ाँच मिनट स <del>्र सी स</del> ्र				
	correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet			आपका प्र समय दिय	9		स ली जाये	ાંગા આર વ	હ્ય આપ	ળા ઝા	ומויש
	will be replaced nor any extra time will be given.						का का नंब	र र MR	पत्रक प	र अंबि	तत करें
	(iii) After this verification is over, the Test Booklet Number should be entered on the OMR Sheet and the OMR Sheet						इस प्रश्न-				
	Number should be entered on this Test Booklet.						कल्प (1),				
4.	Each item has four alternative responses marked (1), (2), (3) and (4). You have to darken the circle as indicated below on			। सही उत्त 1 गया है।		त को पेन	। से भरकर	काला क	रना है उं	नैसा वि	क नीचे
	the correct response against each item.	1					जबकि (3)	गती जना	· ≯.		
	<b>Example :</b> (1) (2) (4) where (3) is the correct response.						<sup>जजाक</sup> (3) ज के अन्दर			ग्रन्क	ग्र दी
5.	Your responses to the items are to be indicated in the OMR						। पा जा पर १ पत्रक पर				
	<b>Sheet given inside the Booklet only.</b> If you mark your response at any place other than in the circle in the OMR	1					ते हैं, तो उ				
,	Sheet, it will not be evaluated.		अन्दर वि	दिये गये वि	नेर्देशों के	ो ध्यानपूर्व	र्गक पढ़ें।				
	Read instructions given inside carefully. Rough Work is to be done in the end of this booklet.	1			•		पुस्तिका वे				
	If you write your Name, Roll Number, Phone Number or						स्थान के 				
	put any mark on any part of the OMR Sheet, except for the						जससे आपव करते हैं, या				
	space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other		प्रयोग व	करते हैं, उँ	नैसे कि अ	अंकित कि	वे गये उत्त	र को मिटा	ना या स		
	unfair means, such as change of response by scratching or	1					घोषित कि				
	using white fluid, you will render yourself liable to disqualification.	1.					OMR पत्र बाद उसे				
9.	You have to return the original OMR Sheet to the invigilators			-			े बाद उस 1 समाप्ति पर				
	at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are						१ ले जा सब		3		
	however, allowed to carry original question booklet and duplicate copy of OMR Sheet on conclusion of examination.	10.				-	<b>गेन का ही</b>				_
10.	Use only Blue/Black Ball point pen.					गणक (	कैलकुलेट	:र) या ल	नाग टेब	ल आ	दि का
	Use of any calculator or log table etc., is prohibited.	1		वर्जित है ज्यागें के 1		÷	<del></del>	<del></del>			
12.	There are no negative marks for incorrect answers.	12.	ગલતર	उत्तरा की	ालए का	इ नकारा	त्मक अंक	નહા હા			

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### 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**.
- **1.** In 8085 microprocessor which of the following flag(s) is (are) affected by an arithmetic operation ?
  - (1) AC flag Only (2) CY flag Only (3) Z flag Only (4) AC, CY, Z flags
- 2. In 8085 microprocessor the address bus is of bits.
  - (1) 4 (2) 8 (3) 16 (4) 32
- 3. In the architecture of 8085 microprocessor match the following :
  - (a) Processing unit (i) Interrupt
  - (b) Instruction unit (ii) General purpose Register
  - (c) Storage and Interface unit (iii) ALU

(iv) Timing and Control

Code :

- (a) (b) (c)
- (1) (iv) (i) (ii)
- (2) (iii) (iv) (ii)
- (3) (ii) (iii) (i)
- (4) (i) (ii) (iv)
- **4.** Which of the following addressing mode is best suited to access elements of an array of contiguous memory locations ?
  - (1) Indexed addressing mode (2) Base Register addressing mode
  - (3) Relative address mode (4) Displacement mode



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- 5. Which of the following is **correct** statement ?
  - (1) In memory mapped I/O, the CPU can manipulate I/O data residing in interface registers that are not used to manipulate memory words.
  - (2) The isolated I/O method isolates memory and I/O addresses so that memory address range is not affected by interface address assignment.
  - (3) In asynchronous serial transfer of data the two units share a common clock.
  - (4) In synchronous serial transmission of data the two units have different clocks.
- 6. A micro-instruction format has micro-ops field which is divided into three subfields F1, F2, F3 each having seven distinct micro-operations, condition field CD for four status bits, branch field BR having four options used in conjunction with address field ADF. The address space is of 128 memory locations. The size of micro-instruction is :
  - (1) 17 bits (2) 20 bits (3) 24 bits (4) 32 bits
- 7. Consider the following four schedules due to three transactions (indicated by the subscript) using read and write on a data item X, denoted by r(X) and w(X) respectively. Which one of them is conflict serializable ?

$$\begin{split} & S_{1}:r_{1}(X); r_{2}(X); w_{1}(X); r_{3}(X); w_{2}(X) \\ & S_{2}:r_{2}(X); r_{1}(X); w_{2}(X); r_{3}(X); w_{1}(X) \\ & S_{3}:r_{3}(X); r_{2}(X); r_{1}(X); w_{2}(X); w_{1}(X) \\ & S_{4}:r_{2}(X); w_{2}(X); r_{3}(X); r_{1}(X); w_{1}(X) \\ & (1) \quad S_{1} \qquad (2) \quad S_{2} \qquad (3) \quad S_{3} \qquad (4) \quad S_{4} \end{split}$$

- 8. Suppose a database schedule S involves transactions  $T_1$ ,  $T_2$ , ...., $T_n$ . Consider the precedence graph of S with vertices representing the transactions and edges representing the conflicts. If S is serializable, which one of the following orderings of the vertices of the precedence graph is guaranteed to yield a serial schedule ?
  - (1) Topological order (2) Depth first order
  - (3) Breadth first order (4) Ascending order of transaction indices
- **9.** If every non-key attribute is functionally dependent on the primary key, then the relation is in .
  - (1) First normal form (2) Second normal form
  - (3) Third normal form (4) Fourth normal form



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- **10.** Consider a relation R (A, B, C, D, E, F, G, H), where each attribute is atomic, and following functional dependencies exist.
  - $CH \rightarrow G$  $A \rightarrow BC$  $B \rightarrow CFH$  $E \rightarrow A$

$$F \rightarrow EC$$

The relation R is

- (1) in 1NF but not in 2NF (2)
- (2) in 2NF but not in 3NF
- (3) in 3NF but not in BCNF (4) in BCNF

**11.** Given two relations  $R_1(A, B)$  and  $R_2(C, D)$ , the result of following query

Select distinct A, B

from  $R_1$ ,  $R_2$ 

is guaranteed to be same as R<sub>1</sub> provided one of the following condition is satisfied.

- (1)  $R_1$  has no duplicates and  $R_2$  is empty.
- (2)  $R_1$  has no duplicates and  $R_2$  is non empty.
- (3) Both  $R_1$  and  $R_2$  have no duplicates.
- (4)  $R_2$  has no duplicates and  $R_1$  is non empty.

12. Consider a schema R(A, B, C, D) and following functional dependencies.

$$A \rightarrow B$$

 $D \rightarrow B$ 

Then decomposition of R into  $R_1(A, B)$ ,  $R_2(B, C)$  and  $R_3(B, D)$  is

- (1) Dependency preserving and lossless join.
- (2) Lossless join but not dependency preserving.
- (3) Dependency preserving but not lossless join.
- (4) Not dependency preserving and not lossless join.

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- **13.** Which of the following is **not** a component of Memory tube display ?
  - (1) Flooding gun (2) Collector (3) Ground (4) Liquid Crystal
- 14. Which of the following is not true in case of Oblique Projections ?
  - (1) Parallel projection rays are not perpendicular to the viewing plane.
  - (2) Parallel lines in space appear parallel on the final projected image.
  - (3) Used exclusively for pictorial purposes rather than formal working drawings.
  - (4) Projectors are always perpendicular to the plane of projection.
- 15. With respect to CRT, the horizontal retrace is defined as :
  - (1) The path an electron beam takes when returning to the left side of the CRT.
  - (2) The path an electron beam takes when returning to the right side of the CRT.
  - (3) The technique of turning the electron beam off while retracing.
  - (4) The technique of turning the electron beam on/off while retracing.
- **16.** Find the equation of the circle  $x^2 + y^2 = 1$  in terms of x'y' coordinates, assuming that the *xy* coordinate system results from a scaling of 3 units in the *x*' direction and 4 units in the *y*' direction.
  - (1)  $3(x')^2 + 4(y')^2 = 1$ (2)  $\left(\frac{x'}{3}\right)^2 + \left(\frac{y'}{4}\right)^2 = 1$ (3)  $(3x')^2 + (4y')^2 = 1$ (4)  $\frac{1}{3}(x')^2 + \frac{1}{4}(y')^2 = 1$

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17. Find the normalization transformation that maps a window whose lower left corner is at (1, 1) and upper right corner is at (3, 5) onto a viewport that is the entire normalized device screen.

(1) 
$$\begin{pmatrix} \frac{1}{2} & 0 & \frac{-1}{2} \\ 0 & \frac{1}{4} & \frac{-1}{4} \\ 0 & 0 & 1 \end{pmatrix}$$
 (2)  $\begin{pmatrix} \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & \frac{-1}{4} & \frac{1}{4} \\ 1 & 1 & 1 \end{pmatrix}$  (3)  $\begin{pmatrix} \frac{1}{2} & 0 & \frac{-1}{2} \\ 0 & \frac{1}{4} & \frac{1}{4} \\ 1 & 0 & 0 \end{pmatrix}$  (4)  $\begin{pmatrix} \frac{1}{2} & 0 & \frac{1}{2} \\ 0 & \frac{1}{4} & \frac{-1}{4} \\ 1 & 0 & 0 \end{pmatrix}$ 

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- 18. The three aspects of Quantization, programmers generally concerned with are :
  - (1) Coding error, Sampling rate and Amplification
  - (2) Sampling rate, Coding error and Conditioning
  - (3) Sampling rate, Aperture time and Coding error
  - (4) Aperture time, Coding error and Strobing
- **19.** The logic of pumping lemma is an example of
  - (1) iteration
  - (2) recursion
  - (3) the divide and conquer principle
  - (4) the pigeon hole principle
- **20.** Heap allocation is required for languages that :
  - (1) use dynamic scope rules
- support dynamic data structures

(3) support recursion

- support recursion and dynamic data structures
- **21.** Pumping lemma for regular language is generally used for proving :

(2)

(4)

- (1) whether two given regular expressions are equivalent
- (2) a given grammar is ambiguous
- (3) a given grammar is regular
- (4) a given grammar is not regular
- 22. Which of the following problems is undecidable ?
  - (1) To determine if two finite automata are equivalent
  - (2) Membership problem for context free grammar
  - (3) Finiteness problem for finite automata
  - (4) Ambiguity problem for context free grammar

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- 23. Finite state machine can recognize language generated by
  - (1) Only context free grammar (2) Only context sensitive grammar
  - (3) Only regular grammar (4) any unambiguous grammar
- **24.** The language  $L = \{a^i b c^i | i \ge 0\}$  over the alphabet  $\{a, b, c\}$  is :
  - (1) a regular language.
  - (2) not a deterministic context free language but a context free language
  - (3) recursive and is a deterministic context free language.
  - (4) not recursive.
- **25.** Suppose we want to download text documents at the rate of 100 pages per second. Assume that a page consists of an average of 24 lines with 80 characters in each line. What is the required bit rate of the channel ?
  - (1) 192 kbps

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(3) 1.248 Mbps

512 kbps

) 1.536 Mbps

- 26. Quadrature Amplitude Modulation means changing both :
  - (1) Frequency and phase of the carrier.
  - (2) Frequency and Amplitude of the carrier.
  - (3) Amplitude and phase of the carrier.
  - (4) Amplitude and Wavelength of the carrier.

27. If a file consisting of 50,000 characters takes 40 seconds to send, then the data rate is

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(1)	1 kbps	(2)	1.25 kbps
(3)	2 kbps	(4)	10 kbps





**28.** Match the following :

	Li	ist - I				List - II	
(a)	Data	ı link	layer		(i)	Encryption	
(b)	Net	work 1	layer		(ii)	Connection control	
(c)	Trar	sport	layer		(iii)	Routing	
(d)	Pres	entati	on lay	ver	(iv)	Framing	-24
Cod	e :						
	(a)	(b)	(c)	(d)			1 2
(1)	(iv)	(iii)	(i)	(ii)			
(2)	(iii)	(iv)	(ii)	(i)			14 92
(3)	(iv)	(ii)	(iii)	(i)		1.1	Ca
(4)	(iv)	(iii)	(ii)	(i)			200
						PII	

**29.** The address of a class B host is to be split into subnets with a 6 - bit subnet number. What is the maximum number of subnets and maximum number of hosts in each subnet ?

- (1) 62 subnets and 1022 hosts (2) 64 subnets and 1024 hosts
- (3) 62 subnets and 254 hosts (4) 64 subnets and 256 hosts

#### **30.** Which of the following statements are **true** ?

- (a) The fragmentation fields in the base header section of IPv4 have moved to the fragmentation extension header in IPv6.
- (b) The authentication extension header is new in IPv6.
- (c) The record route option is not implemented in IPv6.

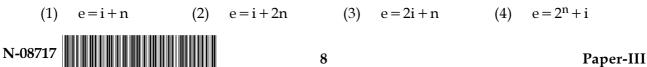
Code :

 (1)
 (a) and (b) Only
 (2)
 (b) and (c) Only

 (3)
 (a) and (c) Only
 (4)
 (a), (b) and (c)

**31.** Consider a full binary tree with n internal nodes, internal path length i, and external path length e. The internal path length of a full binary tree is the sum, taken over all nodes of the tree, of the depth of each node. Similarly, the external path length is the sum, taken over all leaves of the tree, of the depth of each leaf.

Which of the following is **correct** for the full binary tree?



32. You are given a sequence of n elements to sort. The input sequence consists of  $\frac{1}{1}$  subsequences,

each containing k elements. The elements in a given subsequence are all smaller than the elements in the succeeding subsequence and larger than the elements in the preceding subsequence. Thus, all that is needed to sort the whole sequence of length n is to sort the

k elements in each of the  $\frac{n}{k}$  subsequences.

The lower bound on the number of comparisons needed to solve this variant of the sorting problem is :

- (1)  $\Omega$  (n) (2)  $\Omega\left(\frac{n}{k}\right)$  (3)  $\Omega$  (n lg k) (4)  $\Omega\left(\frac{n}{k} \lg \frac{n}{k}\right)$
- **33.** Consider the recurrence relation :

$$T(n) = 8T\left(\frac{n}{2}\right) + Cn, \text{ if } n > 1$$

= b, if n = 1

Where b and c are constants.

The order of the algorithm corrosponding to above recurrence relation is :

- (1) n (2)  $n^2$  (3) n lg n (4)  $n^3$
- 34. Consider the following two sequences :

 $X = \langle B, C, D, C, A, B, C \rangle$ 

and  $Y = \langle C, A, D, B, C, B \rangle$ 

The length of longest common subsequence of X and Y is :

- (1) 5 (2) 3 (3) 4 (4) 2
- **35.** A text is made up of the characters a, b, c, d, e each occurring with the probability 0.11, 0.40, 0.16, 0.09 and 0.24 respectively. The optimal Huffman coding technique will have the average length of :
  - (1) 2.40 (2) 2.16 (3) 2.26 (4) 2.15
- **36.** An undirected graph G (V, E) contains n (n > 2) nodes named  $v_1, v_2, ..., v_n$ . Two nodes  $v_i$  and  $v_j$  are connected if and only if  $0 < |i j| \le 2$ . Each edge  $(v_i, v_j)$  is assigned a weight i + j.

The cost of the minimum spanning tree of such a graph with 10 nodes is :



```
37. An XML document that adheres to syntax rules specified by XML 1.0 specification in that it must satisfy both physical and logical structured, is called :
(1) Well - formed (2) Reasonable (3) Valid (4) Sophisticated
```

38. Which of the following statement(s) is/are TRUE regarding Java Servelets ?

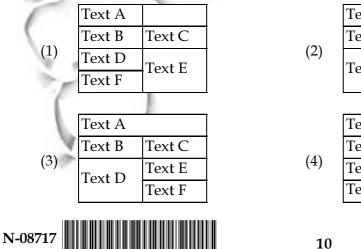
(a) A Java Servelet is a server-side component that runs on the web server and extends the capabilities of a server.

(b) A Servelet can use the user interface classes like AWT or Swing.

```
Code :
```

- (1) Only (a) is TRUE. (2) Only (b) is TRUE.
- (3) Both (a) and (b) are TRUE. (4) Neither (a) nor (b) is TRUE
- **39.** Consider the following HTML table definition :

The above HTML code would render on screen as :



Text A	Text B
Text C	
Text D	Text E
	Text F

	Text A	
、	Text B	Text C
)	Text D	Text E
	Text F	

```
40.
     Which of the following statements is/are TRUE ?
     (a)
           In HTML, character entities are used to incorporate external content into a web page,
           such as images.
      (b)
           Once a web server returns a cookie to a browser, the cookie will be included in all
           future requests from the browser to the same server.
     Code :
     (1)
           Only (a) is TRUE.
                                              (2)
                                                   Only (b) is TRUE.
           Both (a) and (b) are TRUE.
                                             (4)
                                                   Neither (a) nor (b) is TRUE.
     (3)
41.
     Which of the following statements is/are TRUE regarding JAVA ?
           Constants that cannot be changed are declared using the 'static' keyword.
     (a)
           A class can only inherit one class but can implement multiple interfaces.
     (b)
     Code :
     (1)
           Only (a) is TRUE.
                                              (2)
                                                   Only (b) is TRUE
                                                   Neither (a) nor (b) is TRUE.
           Both (a) and (b) are TRUE.
                                             (4)
     (3)
42.
     What is the output of the following JAVA program ?
           Class Test
           {
                 public static void main (String [] args)
                      Test obj = new Test (
                      obj.start (
                 }
                 void start ()
                       String stra="do";
                       String strb = method (stra);
                       System.out.print(":" + stra + strb);
                 String method (String stra)
                           stra=stra+"good";
                           System.out.print (stra);
                           return "good";
           dogood : dogoodgood
                                                   dogood : gooddogood
      (1)
                                              (2)
     (3)
           dogood : dodogood
                                              (4)
                                                   dogood : dogood
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                                               11
                                                                                        Paper-III
```

- 43. Statistical software quality assurance in software engineering involves
  - (1) using sampling in place of exhaustive testing of software.
  - (2) surveying customers to find out their opinions about product quality.
  - (3) tracing each defect to its underlying cause, isolating the vital few causes, and moving to correct them.
  - (4) tracing each defect to its underlying causes, and using the Pareto principle to correct each problem found.
- 44. Which of the following statements is/are FALSE with respect to software testing ?
  - S1 : White-box tests are based on specifications; better at telling whether program meets specification, better at finding errors of ommission.
  - S2 : Black-box tests are based on code; better for finding crashes, out of bounds errors, file not closed errors.
  - S3 : Alpha testing is conducted at the developer's site by a team of highly skilled testers for software that is developed as a product to be used by many customers.
  - (1) Only S1 and S2 are FALSE. (2) Only S1 and S3 are FALSE.
  - (3) Only S2 and S3 are FALSE. (4) All of S1, S2, and S3 are FALSE.
- **45.** A signal processor software is expected to operate for 91.25 days after repair, and the mean software repair time is expected to be 5 minutes. Then, the availability of the software is :
  - (1) 96.9862% (2) 97.9862% (3) 98.9962% (4) 99.9962%
- **46.** Consider the method mcq ( )

{

int mcq (boolean a, boolean b, boolean c, boolean d)

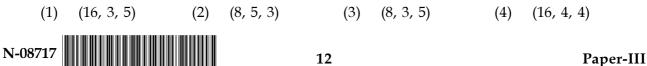
return ans ;

If

M1 = Number of tests to exhaustively test mcq ();

M2 = Minimum number of tests to achieve full statement coverage for mcq (); and M3 = Minimum number of tests to achieve full branch coverage for mcq ();

then (M1, M2, M3) =



**47.** A simple stand - alone software utility is to be developed in 'C' programming by a team of software experts for a computer running Linux and the overall size of this software is estimated to be 20,000 lines of code. Considering (a, b) = (2.4, 1.05) as multiplicative and exponention factor for the basic COCOMO effort estimation equation and (c, d) = (2.5, 0.38) as multiplicative and exponention factor for the basic COCOMO development time estimation equation, approximately how long does the software project take to complete ?

(1) 10.52 months (2) 11.52 months (3) 12.52 months (4) 14.52 months

- **48.** In Software Configuration Management (SCM), which of the following is a use-case supported by standard version control systems ?
  - (a) Managing several versions or releases of a software
  - (b) Filing bug reports and tracking their progress
  - (c) Allowing team members to work in parallel
  - (d) Identifying when and where a regression occurred

Code :

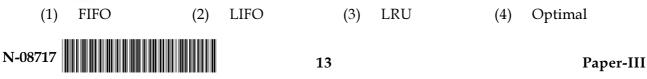
- (1) Only (a), (c), and (d) (2) Only (a), (b), and (c)
- (3) Only (a), (b), and (d) (4) Only (b), (c), and (d)
- **49.** Consider the following four processes with the arrival time and length of CPU burst given in milliseconds :

Process	Arrival Time	Burst Time	
$P_1$	0	8	
$P_2$	1 11	4	
P <sub>3</sub>	2	9	
P <sub>4</sub>	3	5	

The average waiting time for preemptive SJF scheduling algorithm is

(1)	6.5 ms	(2)	7.5 ms	(3)	6.75 ms	(4)	7.75 ms
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**50.** Consider a virtual page reference string 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 Suppose a demand paged virtual memory system running on a computer system such that the main memory has 3 page frames. Then page replacement algorithm has minimum number of page faults.



**51.** User level threads are threads that are visible to the programmer and are unknown to the kernel. The operating system kernel supports and manages kernel level threads. Three different types of models relate user and kernel level threads.

Which of the following statements is/are true ?

- (a) (i) The Many to one model maps many user threads to one kernel thread
  - (ii) The one to one model maps one user thread to one kernel thread
  - (iii) The many to many model maps many user threads to smaller or equal kernel threads
- (b) (i) Many to one model maps many kernel threads to one user thread
  - (ii) One to one model maps one kernel thread to one user thread
  - (iii) Many to many model maps many kernel threads to smaller or equal user threads

Code :

- (1) (a) is true; (b) is false (2) (a) is false; (b) is true
- (3) Both (a) and (b) are true (4) Both (a) and (b) are false
- **52.** Consider a system with five processes  $P_0$  through  $P_4$  and three resource types A, B and C. Resource type A has seven instances, resource type B has two instances and resource type C has six instances suppose at time  $T_0$  we have the following allocation.

Process	Allocation			Re	eques	st	Available			
	Α	В	G	A	В	С	Α	В	С	
P <sub>0</sub>	0	1	-0	0	0	0	0	0	0	
$P_1$	2	0	0	2	0	2				
$P_2$	3	0	3	0	0	0				
P <sub>3</sub>	2	1	1	1	0	0				
$P_4$	0	2	2	0	0	2				
If we imple	ement De	adlocl	k detectio	on algorith	nm w	ve claim	that syste	em is		

- (1) Semaphore (2) Deadlock state
  - Circular wait (4) Not in deadlock state
- **53.** Consider a disk queue with requests for I/O to blocks on cylinders 98, 183, 37, 122, 14, 124, 65, 67. Suppose SSTF disk scheduling algorithm implemented to meet the requests then the total number of head movements are if the disk head is initially at 53.

(1)	224	(2)	248	(3)	236	(4)	240
-----	-----	-----	-----	-----	-----	-----	-----



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54.	The Bounded buffer problem is also	known	as .						
	(1) Producer - consumer problem	(2)	Reader - writer problem						
	(3) Dining Philosophers problem	(4)	Both (2) and (3)						
55.	In Artificial Intelligence (AI), which a	igent d	eals with happy and unhappy state ?						
	(1) Simple reflex agent	(2)	Model based agent						
	(3) Learning agent	(4)	Utility based agent						
20 22									
56.	If b is the branching factor and m is th complexity of greedy search ?	ie max	imum depth of the search tree, what is the space						
	(1) $O(b+m)$ (2) $O(bm)$		(3) $O(b^m)$ (4) $O(m^b)$						
57.			hat the equivalences $P \Leftrightarrow (Q \lor \neg Q)$ and $Q \Leftrightarrow R$						
	hold. Then the truth value of the form								
	(1) True	(2)	False						
	(3) Same as truth table of Q	(4)	Same as truth table of S						
58.	"If X, then Y unless Z" is represented	l by w	hich of the following formulae in propositional						
	logic ?								
	$(1)  (X \land Y) \to \neg Z  (2)  (X \land \neg Z)$	$) \rightarrow Y$	(3) $X \to (Y \land \neg Z)$ (4) $Y \to (X \land \neg Z)$						
	-								
59.	Consider the following two well-form	ned for	mulas in prepositional logic.						
	F1: $P \Rightarrow \neg P$ F2: $(P \Rightarrow \neg P) \lor (\neg P \Rightarrow P)$								
	F2 : $(P \Rightarrow \neg P) \lor (\neg P \Rightarrow P)$ Which of the following statements is	correct	- 2						
1	(1) F1 is Satisfiable, F2 is valid	(2)	F1 is unsatisfiable, F2 is Satisfiable						
(	<ul><li>(3) F1 is unsatisfiable, F2 is valid</li></ul>	(4)	F1 and F2 both are Satisfiable						
		( )							
60.	Standard planning algorithms assum	e envi	ronment to be .						
	(1) Both deterministic and fully obs	ervabl	e						
	(2) Neither deterministic nor fully of	bserva	able						
	(3) Deterministic but not fully observed	rvable							
	(4) Not deterministic but fully observed	rvable							
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- **61.** Which of the following statements is **not** correct ?
  - (1) Every recursive language is recursively enumerable.
  - (2)  $L = \{0^n 1^n 0^n | n=1, 2, 3, ....\}$  is recursively enumerable.
  - (3) Recursive languages are closed under intersection.
  - (4) Recursive languages are not closed under intersection.
- 62. Context free grammar is not closed under :
  - (1) Concatenation (2) Complementation
  - (3) Kleene Star

- (4) Union
- **63.** Consider the following languages :

$$L_1 = \{a^m b^n \mid m \neq n\}$$

- $L_2 = \{a^m b^n \mid m = 2n+1\}$
- $L_3 = \{a^m b^n \mid m \neq 2n\}$

Which one of the following statement is correct?

- (1) Only  $L_1$  and  $L_2$  are context free languages
- (2) Only  $L_1$  and  $L_3$  are context free languages
- (3) Only  $L_2$  and  $L_3$  are context free languages
- (4)  $L_1$ ,  $L_2$  and  $L_3$  are context free languages

## **64.** A $4 \times 4$ DFT matrix is given by :

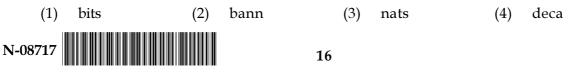
 $\frac{1}{2} \begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & x & -1 & y \\ 1 & -1 & 1 & -1 \\ 1 & -j & -1 & j \end{bmatrix}$ 

 $(j^2 = -1)$ Where values of x and y are , respectively. (1) 1, -1 (2) -1, 1 (3) -j, j (4) j, -j

**65.** Entropy of a discrete random variable with possible values  $\{x_1, x_2, ..., x_n\}$  and probability density function P(X) is :

$$H(X) = -\sum_{i=1}^{n} P(x_i) \log_b P(x_i)$$

The value of b gives the units of entropy. The unit for b = 10 is :



66. For any binary (n, h) linear code with minimum distance (2t+1) or greater

$$n - h \ge \log_2 \left[ \sum_{i=0}^{\alpha} \binom{n}{i} \right] \text{ where } \alpha \text{ is :}$$

$$(1) \quad 2t + 1 \qquad (2) \quad t + 1 \qquad (3) \quad t - 1 \qquad (4) \quad t$$

**67.** Which of the following is a valid reason for causing degeneracy in a transportation problem ? Here m is no. of rows and n is no. of columns in transportation table.

- (1) When the number of allocations is m + n 1.
- (2) When two or more occupied cells become unoccupied simultaneously.
- (3) When the number of allocations is less than m + n 1.
- (4) When a loop cannot be drawn without using unoccupied cells, except the starting cell of the loop.
- **68.** Consider the following LPP :

Max  $Z = 15x_1 + 10x_2$ 

Subject to the constraints

$$\begin{aligned} 4x_1 + 6x_2 &\leq 360\\ 3x_1 + 0x_2 &\leq 180\\ 0x_1 + 5x_2 &\leq 200\\ x_1, x_2 &\geq 0 \end{aligned}$$

The solution of the LPP using Graphical solution technique is :

(1) 
$$x_1 = 60, x_2 = 0 \text{ and } Z = 900$$

(3) 
$$x_1 = 60, x_2 = 30 \text{ and } Z = 1200$$

(2)  $x_1 = 60, x_2 = 20$  and Z = 1100(4)  $x_1 = 50, x_2 = 40$  and Z = 1150

**69.** Consider the following LPP :

 $\begin{array}{l} \text{Min } Z = 2x_1 + x_2 + 3x_3\\ \text{Subject to :}\\ x_1 - 2x_2 + x_3 &\geq 4\\ 2x_1 + x_2 + x_3 &\leq 8\\ x_1 - x_3 &\geq 0\\ x_1, x_2, x_3 &\geq 0\\ \end{array}$ The solution of this LPP using Dual Simplex Method is :  $\begin{array}{l} (1) \quad x_1 = 0, \ x_2 = 0, \ x_3 = 3 \ \text{and} \ Z = 9\\ (3) \quad x_1 = 4, \ x_2 = 0, \ x_3 = 0 \ \text{and} \ Z = 8\\ \end{array}$ 

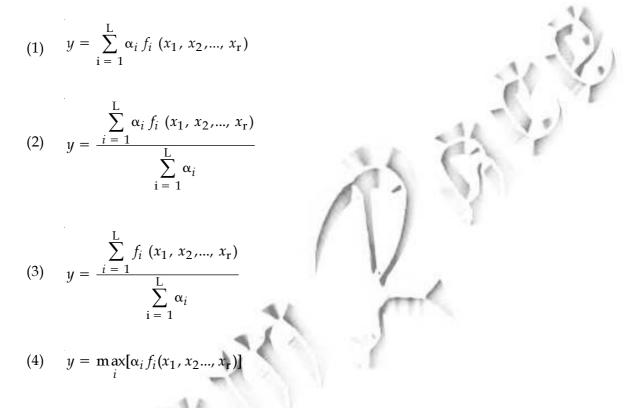


70. Consider a Takagi - Sugeno - Kang (TSK) Model consisting of rules of the form :

If  $x_1$  is  $A_{i1}$  and ... and  $x_r$  is  $A_{ir}$ 

THEN  $y = f_i(x_1, x_2, ..., x_r) = b_{i0} + b_{i1} x_1 + ... + b_{ir} x_r$ 

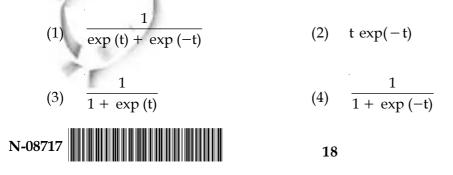
assume,  $\alpha_i$  is the matching degree of rule *i*, then the total output of the model is given by :



**71.** Consider a single perceptron with sign activation function. The perceptron is represented by weight vector  $[0.4 - 0.3 \ 0.1]^{t}$  and a bias  $\theta = 0$ . If the input vector to the perceptron is  $X = [0.2 \ 0.6 \ 0.5]$  then the output of the perceptron is :

(1) 1 (2) 0 (3) 
$$-0.05$$
 (4)  $-1$ 

**72.** The Sigmoid activation function *f*(t) is defined as :



73.	Con	sider the following stat	ements :		
	(a)	UNIX provides three	types of permissio	ons	
		* Read			
		* Write			
		* Execute			
	(b)	UNIX provides three	sets of permission	S	3.0
		* permission for a	owner		63
		* permission for g	group		
		* permission for a	others		20 32
	Whi	ch of the above statem	ent/s is/are <b>true</b>	?	- C 1 1
	(1)	Only (a)	(2)	Only (b)	1 92
	(3)	Both (a) and (b)	(4)	Neither (a) nor (b)	
74.	Whi	ch of the following rou	ting technique / t	echniques is / are usec	l in distributed systems ?
	(a)	Fixed Routing			1
	(b)	Virtual Routing	1		
	(c)	Dynamic Routing	1		
	Cod	e :			
	(1)	(a) only (2)	(a) and (b) only	(3) (c) only	(4) All (a), (b), (c)
			< X &		
75.		ch the following WIND rol and File manipulat		and UNIX system calls	with reference to process
	com	Windows	1011.	UNIX	
	(a)	Create - process ()	(i)	Open ( )	
	(u) (b)	WaitForSingleObject		Close ()	
	(c)	CreateFile ()	(iii)	Fork ()	
	(d)	CloseHandle ()	(iv)	Wait ( )	
	Cod				
(		(a) (b) (c) (d)			
	(1)	(iii) (iv) (i) (ii)			
	(2)	(iv) (iii) (i) (ii)			
	(3)	(iv) (iii) (ii) (i)			
	(4)	(iii) (iv) (ii) (i)			
	- 6	20			
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Space For Rough Work

