

Test Booklet No.

प्रश्नपत्रिका क्र.

M

Paper-III

COMPUTER SCIENCE AND APPLICATION

Signature and Name of Invigilator

Seat No.

(In figures as in Admit Card)

1. (Signature)

(Name)

Seat No.

(In words)

2. (Signature)

(Name)

OMR Sheet No.

(To be filled by the Candidate)

AUG - 37315

Time Allowed : 2½ Hours]

[Maximum Marks : 150

Number of Pages in this Booklet : 32

Number of Questions in this Booklet : 75

Instructions for the Candidates

- Write your Seat No. and OMR Sheet No. in the space provided on the top of this page.
- This paper consists of 75 objective type questions. Each question will carry two marks. All questions of Paper-III will be compulsory, covering entire syllabus (including all electives, without options).
- 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 :
 - 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.
 - 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.**
 - After this verification is over, the OMR Sheet Number should be entered on this Test Booklet.
- 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)	(C)	(D)
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- 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.
- Read instructions given inside carefully.
- Rough Work is to be done at the end of this booklet.
- 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.
- 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.
- Use only Blue/Black Ball point pen.**
- Use of any calculator or log table, etc., is prohibited.**
- There is no negative marking for incorrect answers.**

विद्यार्थ्यांसाठी महत्त्वाच्या सूचना

- परिक्षार्थींनी आपला आसन क्रमांक या पृष्ठावरील वरच्या कोपऱ्यात लिहावा. तसेच आपणांस दिलेल्या उत्तरपत्रिकेचा क्रमांक त्याखाली लिहावा.
- सदर प्रश्नपत्रिकेत 75 बहुपर्यायी प्रश्न आहेत. प्रत्येक प्रश्नास दोन गुण आहेत. या प्रश्नपत्रिकेतील सर्व प्रश्न सोडविणे अनिवार्य आहे. सदरचे प्रश्न हे या विषयाच्या संपूर्ण अभ्यासक्रमावर आधारित आहेत.
- परीक्षा सुरु झाल्यावर विद्यार्थ्यांला प्रश्नपत्रिका दिली जाईल. सुरुवातीच्या 5 मिनीटांमध्ये आपण सदर प्रश्नपत्रिका उघडून खालील बाबी अवश्य तपासून घ्याव्यात.
 - प्रश्नपत्रिका उघडण्यासाठी प्रश्नपत्रिकेवर लावलेले सील उघडावे. सील नसलेली किंवा सील उघडलेली प्रश्नपत्रिका स्विकारू नये.
 - पहिल्या पृष्ठावर नमूद केल्याप्रमाणे प्रश्नपत्रिकेची एकूण पृष्ठे तसेच प्रश्नपत्रिकेतील एकूण प्रश्नांची संख्या पडताळून घ्यावी. 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.
 - वरीलप्रमाणे सर्व पडताळून पहिल्यानंतरच प्रश्नपत्रिकेवर ओ.एम.आर. उत्तरपत्रिकेचा नंबर लिहावा.
- 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)	(C)	(D)
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- या प्रश्नपत्रिकेतील प्रश्नांची उत्तरे ओ.एम.आर. उत्तरपत्रिकेतच दर्शवावीत. इतर ठिकाणी लिहिलेली उत्तरे तपासली जाणार नाहीत.
- आत दिलेल्या सूचना काळजीपूर्वक वाचाव्यात.
- प्रश्नपत्रिकेच्या शेवटी जोडलेल्या कोऱ्या पानावरच कच्चे काम करावे.
- जर आपण ओ.एम.आर. वर नमूद केलेल्या ठिकाणा व्यतिरिक्त इतर कोठेही नाव, आसन क्रमांक, फोन नंबर किंवा ओळख पटेल अशी कोणतीही खूप केलेली आढळून आल्यास अथवा असभ्य भाषेचा वापर किंवा इतर गैरमागाचा अवलंब केल्यास विद्यार्थ्यांला परीक्षेस अपात्र ठरविण्यात येईल.
- परीक्षा संपल्यानंतर विद्यार्थ्यांने मूळ ओ.एम.आर. उत्तरपत्रिका पर्यवेक्षकांकडे परत करणे आवश्यक आहे. तथापी, प्रश्नपत्रिका व ओ.एम.आर. उत्तरपत्रिकेची द्वितीय प्रत आपल्याबरोबर नेण्यास विद्यार्थ्यांना परवानगी आहे.
- फक्त निळा किंवा काळा बॉल पेनचाच वापर करावा.**
- कॅलक्युलेटर किंवा लॉग टेबल वापरण्यास परवानगी नाही.**
- चुकीच्या उत्तरासाठी गुण कपात केली जाणार नाही.**

AUG - 37315/III

Computer Science and Application
Paper III

Time Allowed : 2½ Hours]

[Maximum Marks : 150

Note : This paper contains **Seventy Five (75)** multiple choice questions, each question carrying **Two (2)** marks. Attempt *All* questions.

1. The RAM created using bipolar transistors is called :

(A) Dynamic RAM	(B) Static RAM
(C) Permanent RAM	(D) DDR RAM

2. The external system bus architecture is created from architecture.

(A) Pascal	(B) Dennis Ritchie
(C) Charles Babbage	(D) Von Neumann

3. Which RAM is created using MOS transistors ?

(A) Dynamic RAM	(B) Static RAM
(C) Permanent RAM	(D) SD RAM

4. DS stands for :

(A) Direct Segment	(B) Declare Segment
(C) Divide Segment	(D) Data Segment

5. Which of the following are the two main components of the CPU ?
- (A) Control Unit and Registers
 - (B) Registers and Main Memory
 - (C) Control Unit and ALU
 - (D) ALU and Bus
6. What is disjointless constraint ?
- (A) It requires that an entity belongs to no more than one level entity set
 - (B) The same entity may belong to more than one level
 - (C) The database must contain an unmatched foreign key value
 - (D) An entity can be joined with another entity in the same level entity set
7. Block interleaved distributed parity is RAID level :
- (A) 2
 - (B) 3
 - (C) 4
 - (D) 5

8. In SQL the statement `select * from R, S` is equivalent to :
- (A) `Select * from R natural join S`
- (B) `Select * from R cross join S`
- (C) `Select * from R union S`
- (D) `Select * from R inner join S`
9. Let R be a relation schema, $R(A, B, C, D)$ and $F = (A \rightarrow B, B \rightarrow C, C \rightarrow A)$ is the set of functional dependency. Determine the key of the relation :
- (A) A (B) B
- (C) C (D) D
10. Let r be a relation instance with schema $R = (A, B, C, D)$. We define $r_1 = \Pi_{A, B, C}(r)$ and $r_2 = \Pi_{A, D}(r)$. Let $s = r_1 * r_2$ where $*$ denotes natural join. Given that the decomposition of r in r_1 and r_2 is lossy, which one of the following is *true* ?
- (A) $s \subset r$ (B) $r \cup s = r$
- (C) $r \subset s$ (D) $r * s = s$

11. Which of the following statements is/are *false* ?

(I) XML overcomes limitations of HTML to support a structured way of organizing content.

(II) XML specification is not case sensitive while HTML specification is case sensitive.

(III) XML supports user defined tags while HTML uses pre-defined tags.

(IV) XML tags need not be closed while HTML tags must be closed.

(A) (II) only (B) (I) only

(C) (II) and (IV) only (D) (III) and (IV) only

12. In one of the pairs of protocols given below, both the protocols can use multiple TCP connections between the same client and the server. Which one is that ?

(A) HTTP, FTP (B) HTTP, TELNET

(C) FTP, SMTP (D) HTTP, SMTP

13. HTML has language elements which permit certain actions other than describing the structure of the web document. Which one of the following action is *not* supported by pure HTML pages ?
- (A) Embed web objects from different sites into same page.
 - (B) Refresh the page automatically after a specified interval.
 - (C) Automatically redirect to another page upon download.
 - (D) Display the client time as part of the page.
14. In a web server, ten web pages are stored with the URLs of the form `http://www.yourname.com/var.html`; where, var is different number from 1 to 10 for each web page. Suppose, the client stores the web page with var = 1 (say W_1) in local machine, edits and then tests. Rest of the web pages remain on the web server. W_1 contains several relative URLs of the form “var.html” referring to the other web pages. Which of the following statements needs to be added to W_1 , so that all the relative URLs in W_1 refer to the appropriate web pages on web server ?
- (A) `<ahref:“http://www.yourname.com/”, href:“.....var.html”>`
 - (B) `<basehref:“http://www.yourname.com/”>`
 - (C) `<ahref:“http://www.yourname.com/”>`
 - (D) `<basehref:“http://www.yourname.com/”, range:“.....var.html”>`

15. Match the problem domains in Group I with the solution technologies in Group II :

Group I	Group II
(P) Services oriented computing	(1) Interoperability
(Q) Heterogeneous communicating syst.	(2) BPMN
(R) Information representation	(3) Publish-find bind
(S) Process description	(4) XML
(A) (P)–(1), (Q)–(2), (R)–(3), (S)–(4)	
(B) (P)–(3), (Q)–(4), (R)–(2), (S)–(1)	
(C) (P)–(3), (Q)–(1), (R)–(4), (S)–(2)	
(D) (P)–(4), (Q)–(3), (R)–(2), (S)–(1)	

16. What is the maximum number of reduce moves that can be taken by a bottom-up parser for a grammar with no epsilon and unit production (i.e. of type $A \rightarrow \epsilon$ and $A \rightarrow a$) to parse a string with ' n ' tokens ?

- | | |
|--------------|-------------|
| (A) $n/2$ | (B) $n - 1$ |
| (C) $2n - 1$ | (D) 2^n |

17. Consider the language $L_1 = \phi$ and $L_2 = \{a\}$. Which one of the following represents $L_1L_2^*UL_1^*$?

(A) $\{\epsilon\}$

(B) ϕ

(C) a^*

(D) $\{\epsilon, a\}$

18. In the IPv4 addressing format, the number of networks allowed under Class C addresses is :

(A) 2^{14}

(B) 2^7

(C) 2^{21}

(D) 2^{24}

19. Which of the following transport layer protocols is used to support electronic mail ?

(A) SMTP

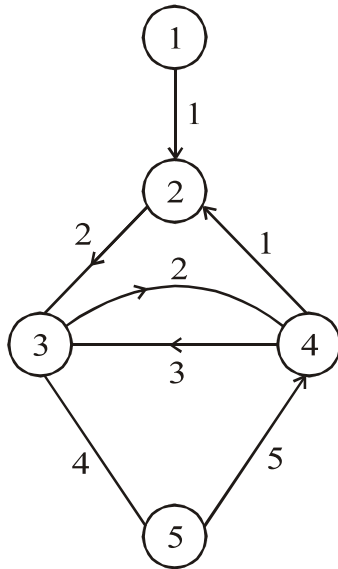
(B) IP

(C) TCP

(D) UDP

22. Suppose to reduce overall link cost we took a decision to reduce the number of repeaters from 50 (Fifty) to 10 (Ten), calculate the probability that single repeater *does not* fail during one year will be :
- (A) 0.110 (B) 0.120
(C) 0.990 (D) 0.001
23. From Case (I) and Case (II) the following inference is *correct* :
- (A) Increasing repeaters increases reliability
(B) Decreasing repeaters increases reliability
(C) Increasing repeaters decreases reliability
(D) Decreasing repeaters decreases reliability
24. Suppose an application layer entity wants to send an L-byte message to its peer process, using an existing TCP connection. The TCP segment consists of the message plus 20 bytes of header. The segment is encapsulated into an IP packet that has an additional 20 bytes of header and trailer. What percentage of the transmitted bits in the physical layer correspond to message information, if $L = 100$ bytes, 500 bytes, 1000 bytes ?
- (A) 67%, 89%, 94% (B) 63%, 90%, 95%
(C) 63%, 94%, 89% (D) 56%, 95%, 90%

25. The eccentricity of node labeled 5 in the graph is :



- | | |
|-------|-------|
| (A) 6 | (B) 7 |
| (C) 3 | (D) 4 |

26. Consider a hashing function that resolves collisions by quadratic probing. Assume the address space is indexed from 1 to 8.

Which of the following locations will never be probed if a collision occurs at position 4 ?

- | | |
|-------|-------|
| (A) 4 | (B) 5 |
| (C) 8 | (D) 2 |

27. A binary tree in which every non-leaf node has non-empty left and right subtrees is called a strictly binary tree. Such a tree with 10 leaf nodes :
- (A) can not have more than 19 nodes
 - (B) has exactly 19 nodes
 - (C) has exactly 17 nodes
 - (D) can not have more than 17 nodes
28. The number of binary relations on a set with n elements is :
- (A) n^2
 - (B) 2^n
 - (C) 2^{n^2}
 - (D) $\log n^3$
29. MIMD stands for :
- (A) Multiple Instruction Multiple Data Stream
 - (B) Minimum Instruction Minimum Data Stream
 - (C) Multiple Instruction Minimum Data Stream
 - (D) Minimum Instruction Multiple Data Stream

30. The multiprocessor system can be viewed as one computer with a global primary storage area shared by all the processors. This system is sometimes regarded as :

- (A) Loosely coupled (B) Tightly coupled
(C) Medium coupled (D) Hybrid coupled

31. The minimum number of colors needed to color a graph having ($n > 3$) vertices and 2 edges is :

- (A) 3 (B) 4
(C) 2 (D) 1

32. In Software Engineering best suited model for e-commerce related softwares is :

- (A) UML (B) Incremental model
(C) Prototyping model (D) OOP model

33. In a software testing process of Software Engineering, Software products are tested in realistic environments by using :
- (A) Integration planning
 - (B) SWDLC
 - (C) Alpha and beta testing
 - (D) Verification and Validation
34. In a software testing step of software engineering the process of dynamic testing includes :
- (A) Specific data inputs and outputs
 - (B) Modular testing
 - (C) Case based testing
 - (D) Development of test cases and test procedures
35. In Software Engineering, System level requirement analysis step *does not* necessarily consists of :
- (A) All software relevant issues
 - (B) All requirements that will drive design
 - (C) All areas that need clarification
 - (D) All management relevant issues

36. Which of the following is *not* a characteristic of scrum model of product development ?
- (A) Incremental development
 - (B) Agile nature
 - (C) Stable requirements
 - (D) Time-boxed scheduling
37. enhances performance and functionality of the software after delivery.
- (A) Re-design
 - (B) Re-engineering
 - (C) Post-checking
 - (D) Maintenance
38. is a software engineering task that bridges the gap between system level requirements engineering and software design.
- (A) Requirements analysis
 - (B) Cost analysis
 - (C) Design analysis
 - (D) Risk analysis

39. The software quality assurance activity which is performed to check errors in logic, function, or implementation for any representation of the software is called :
- (A) Inspection
 - (B) Formal technical review(s)
 - (C) Walkthrough
 - (D) Auditing
40. Cohesion is a qualitative indication of the degree to which a module :
- (A) can be written more compactly
 - (B) focuses on just one thing
 - (C) is able to complete its function in a timely manner
 - (D) is connected to other modules and the outside world
41. The document prepared after the design phase is known as :
- (A) System specification
 - (B) Performance specification
 - (C) Design specification
 - (D) Requirement specification

42. Actual programming of software code is undertaken during the
step in the SDLC.
- (A) maintenance and evaluation
 - (B) design
 - (C) analysis
 - (D) development and documentation
43. The approach in top-down analysis and design is :
- (A) to identify the top-level functions by combining many small components
into a single entity
 - (B) to prepare flowcharts after programming has been completed
 - (C) to identify a top-level function and create a hierarchy of lower-level
modules and components
 - (D) all of the above

44. The major goal of requirement determination phase of information system development is to :

- (A) determine whether information is needed by the organization
- (B) determine what information is needed by the organization
- (C) determine how the needed information can be provided
- (D) determine when information is to be provided

45. The role of a system analyst drawing up requirements specifications is similar to that of :

- (A) an architect designing a building
- (B) a structural engineer designing a building
- (C) a contractor constructing a building
- (D) the workers constructing a building

46. Context : Rama gave a physics book to Shama. She studied physics from her book.

In the given context which of the following could be inferred unambiguously ?

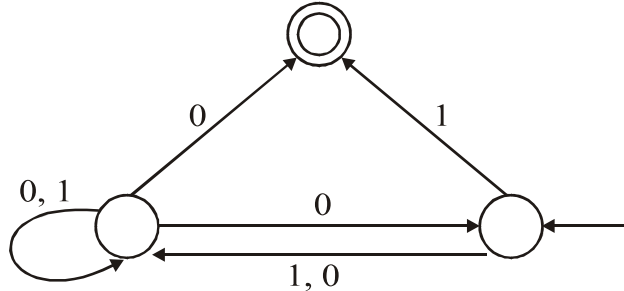
- (A) Shama used Rama's book for physics studies
 - (B) Shama used own book for physics studies
 - (C) Rama used her own book to study physics
 - (D) Can't infer any of these
47. The semantic nets do *not* support :
- (A) Representation of meta-knowledge
 - (B) Modeling taxonomy
 - (C) Plagiarism detection
 - (D) Search for antonyms

50. Information : Books are on a shelf. Books are in a bag. Shelf is furniture. Furniture and bag are blue. Furniture and bag are housed in a store.

In a tree representation of the above information which of the following is *not true* ?

- (A) Started with Book by following DFS, Bag is the last node to be visited
- (B) Started with Bag by following DFS, Book is the last node to be visited
- (C) Started with Shelf by following DFS, Bag is the last node to be visited
- (D) Started with Book by following DFS, Bag is the next node to be visited

51. Consider the NFA shown below :



Let the language accepted by M be L. Let L_1 be the language accepted by the NFA M_1 obtained by changing the accepting states of M to non-accepting states and non-accepting states to accepting states. Which of the following statements is *true* ?

- (A) $L_1 = \{0, 1\}^* - L$
- (B) $L_1 = \{0, 1\}^*$
- (C) $L_1 \subseteq L$
- (D) $L_1 = L$

55. Which one of the following is *not* primitive recursive but partially recursive ?

- (A) Carnot Function (B) Riemann Function
 (C) Bounded Function (D) Ackermann Function

56. Consider the following two regular languages :

$$S_1 : \{0^{2n} \mid n \geq 1\}$$

$$S_2 : \{0^m 1^n 0^{m+n} \mid m, n \geq 1\}$$

Which of the following statements is *false* ?

- (A) Only S_1 is correct
 (B) Only S_2 is correct
 (C) Both S_1 and S_2 are correct
 (D) None of S_1 and S_2 is correct

57. A four input neuron has weights 1, 2, 3 and 4. The transfer function is linear with the constant of proportionality being equal to 2. The inputs are 4, 10, 5 and 20 respectively. The output will be :

- (A) 238 (B) 76
 (C) 119 (D) 120

58. An associative network is :

- (A) A neural network that contains no loop
- (B) A neural network that contains feedback
- (C) A neural network that has only one loop
- (D) A neural network that has multiple loops

59. Fuzzy Logic is a form of :

- (A) Two-valued Logic
- (B) Crisp set Logic
- (C) Binary Logic
- (D) Multi-valued Logic

60. When a computer can correctly recognize faces of users with a high degree of reliability, it is using :

- (A) Fuzzy Logic
- (B) Pattern Recognition
- (C) Image Analysis
- (D) OCR

63. The Indian army has established 5 camps in a remote border area and has constructed 8 roads connecting these camps. There are no multiple roads between any two camps and no camp is isolated. Under these assumptions which of the following statements can be true simultaneously ?
- (i) It is possible to start from a camp and come back to it without traversing any road twice.
 - (ii) Each camp is connected to four other camps.
 - (iii) At least one camp is connected to every other camp.
 - (iv) There is one camp connected to only one of the other four camps.
- (A) (i) and (iii) (B) (ii) and (iii)
(C) (i) and (iv) (D) (ii) and (iv)
64. In how many ways can a four digit number be formed with distinct digits ?
- (A) 5040 (B) 5670
(C) 4536 (D) 4800
65. In how many different ways can a four digit number be formed if repetitions of digits is allowed ?
- (A) 9999 (B) 9000
(C) 8100 (D) 10000

66. A 5-layer perceptron has a linear activation function in all its neurons. Without affecting its functionality could you redesign this architecture by reducing the number of layers ? How many layers could be reduced at the most ?
- (A) (no, 0) (B) (yes, 1)
(C) (yes, 2) (D) (yes, 3)
67. The activation function $f(x) = \min(100, x)$ is :
- (i) Symmetric
(ii) Computationally simple
(iii) Linear
(iv) Able to model of scenario like “maximum price of an item is Rs. 100”
- (A) (i) and (ii) (B) (ii) and (iii)
(C) (ii) and (iv) (D) (i), (ii) and (iv)
68. The database structural query language SQL implements ternary logic as a means of handling comparisons with NULL field content. For the NULL in SQL an actual value is either true or false, but is not currently recorded in the database (unknown). To take care of this, a ternary logic suggested is as follows. The third state Unknown (U) represents the truth value : either true or false. Extension of Boolean NOT for U will be, NOT (U) = U and that for Boolean OR will be $S \text{ OR } U = \text{Max}(S, U)$ where S is the truth value of a given statement and $T > U > F$ holds. What would be $U \rightarrow F$?
- (A) T
(B) F
(C) U
(D) data is inadequate for computing

Note (For Q. Nos. 69 & 70) : Data : 6% people like cricket very much. 9% people like Burfl very much. Burfl Cricket Club (BCC) is a group of people who like cricket as well as Burfl.

69. Which of the following could be a *correct* representation of “Shyam likes Burfl and he very much likes cricket” ?
- (A) $BCC = \{Shyam, Rama, Alice\}$
 - (B) $mLikeBurphl(Shyam, 0.6); mLikeCricket(Shyam, 0.9);$
 - (C) $mBCC(Shyam, 0.054)$
 - (D) (A) or (B) but not (C)
70. Which of the following would help categorize the people in your city on the basis of their liking towards Burphl and Cricket ?
- (A) Probability theory
 - (B) Fuzzy sets
 - (C) Neuro and Fuzzy hybrid
 - (D) Any one of (A), (B) and (C)
71. In the Win32 API, there is no distinction between :
- (A) long jumps and short jumps
 - (B) long pointers and short pointers
 - (C) near jumps and far jumps
 - (D) long pointers and near pointers

72. Which one of the following UNIX commands can list the symbols defined in a library/elf executable ?
- (A) ld (B) nm
(C) strip (D) du
73. Which of the following sections of an executable binary file on UNIX has all uninitialized data items ?
- (A) .bss section (B) .data section
(C) .rodata section (D) .text section
74. The read system call returns :
- (A) total number of bytes (B) file descriptor of the file
(C) successful read flag (D) address of the file
75. Type checking is normally done during :
- (A) lexical analysis
(B) syntax analysis
(C) syntax directed translation
(D) code generation

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