

Test Paper : II

Test Subject : **COMPUTER SCIENCE AND APPLICATIONS**

Test Subject Code : **K-2415**

Test Booklet Serial No. : _____

OMR Sheet No. : _____

Roll No.

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(Figures as per admission card)

Name & Signature of Invigilator/s

Signature : _____

Name : _____

Paper : II

Subject : COMPUTER SCIENCE AND APPLICATIONS

Time : 1 Hour 15 Minutes

Maximum Marks : 100

Number of Pages in this Booklet : 8

Number of Questions in this Booklet : 50

ಅಭ್ಯರ್ಥಿಗಳಿಗೆ ಸೂಚನೆಗಳು

1. ಈ ಪುಟದ ಮೇಲ್ಭಾಗದಲ್ಲಿ ಒದಗಿಸಿದ ಸ್ಥಳದಲ್ಲಿ ನಿಮ್ಮ ರೋಲ್ ನಂಬರನ್ನು ಬರೆಯಿರಿ.
2. ಈ ಪತ್ರಿಕೆಯು ಬಹು ಆಯ್ಕೆ ವಿಧದ ಐವತ್ತು ಪ್ರಶ್ನೆಗಳನ್ನು ಒಳಗೊಂಡಿದೆ.
3. ಪರೀಕ್ಷೆಯ ಪ್ರಾರಂಭದಲ್ಲಿ ಪ್ರಶ್ನೆಪುಸ್ತಕವನ್ನು ನಿಮಗೇ ನೀಡಲಾಗುವುದು. ಮೊದಲ 5 ನಿಮಿಷಗಳಲ್ಲಿ ನೀವು ಪುಸ್ತಕವನ್ನು ತೆರೆಯಲು ಮತ್ತು ಕೆಳಗಿನಂತೆ ಕಡ್ಡಾಯವಾಗಿ ಪರಿಶೀಲಿಸಲು ಕೋರಲಾಗಿದೆ.
(i) ಪ್ರಶ್ನೆ ಪುಸ್ತಕಕ್ಕೆ ಪ್ರವೇಶಾಪಕಾರ ಪಡೆಯಲು, ಈ ಹೊದಿಕೆ ಪುಟದ ಅಂಚಿನ ಮೇಲಿರುವ ಪೇಪರ್ ಸೀಲನ್ನು ಹರಿಯಿರಿ. ಸ್ವಿಚ್ ಸೀಲ್ ಇಲ್ಲದ ಅಥವಾ ತೆರದ ಪುಸ್ತಕವನ್ನು ಸ್ವೀಕರಿಸಬೇಡಿ.
(ii) ಪುಸ್ತಕಿಯಲ್ಲಿನ ಪ್ರಶ್ನೆಗಳ ಸಂಖ್ಯೆ ಮತ್ತು ಪುಟಗಳ ಸಂಖ್ಯೆಯನ್ನು ಮುಖಪುಟದ ಮೇಲೆ ಮುದ್ರಿಸಿದ ಮಾಹಿತಿಯೊಂದಿಗೆ ತಾಳೆ ನೋಡಿರಿ. ಪುಟಗಳು/ಪ್ರಶ್ನೆಗಳು ಕಾಣೆಯಾದ, ಅಥವಾ ದ್ವಿಪ್ರತಿ ಅಥವಾ ಅನುಕ್ರಮವಾಗಿಲ್ಲದ ಅಥವಾ ಇತರ ಯಾವುದೇ ವ್ಯತ್ಯಾಸದ ದೋಷಪೂರಿತ ಪುಸ್ತಕವನ್ನು ಕೂಡಲೆ 5 ನಿಮಿಷದ ಅವಧಿ ಒಳಗೆ, ಸಂವೀಕ್ಷಕರಿಂದ ಸರಿ ಇರುವ ಪುಸ್ತಕಕ್ಕೆ ಬದಲಾಯಿಸಿಕೊಳ್ಳಬೇಕು. ಆ ಬಳಿಕ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಬದಲಾಯಿಸಲಾಗುವುದಿಲ್ಲ. ಯಾವುದೇ ಹೆಚ್ಚು ಸಮಯವನ್ನೂ ಕೊಡಲಾಗುವುದಿಲ್ಲ.
4. ಪ್ರತಿಯೊಂದು ಪ್ರಶ್ನೆಗೂ (A), (B), (C) ಮತ್ತು (D) ಎಂದು ಗುರುತಿಸಿದ ನಾಲ್ಕು ಪರ್ಯಾಯ ಉತ್ತರಗಳಿವೆ. ನೀವು ಪ್ರಶ್ನೆಯ ಎದುರು ಸರಿಯಾದ ಉತ್ತರದ ಮೇಲೆ, ಕೆಳಗೆ ಕಾಣಿಸಿದಂತೆ ಅಂಡಾಕೃತಿಯನ್ನು ಕವಚಿಸಬೇಕು.
ಉದಾಹರಣೆ:

A	B	C	D
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(C) ಸರಿಯಾದ ಉತ್ತರವಾಗಿದ್ದಾಗ.
5. ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ರಲ್ಲಿ ಕೊಟ್ಟಿರುವ OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ I ಮತ್ತು ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ II ರಲ್ಲಿ ಇರುವ ಪ್ರಶ್ನೆಗಳಿಗೆ ನಿಮ್ಮ ಉತ್ತರಗಳನ್ನು ಸೂಚಿಸತಕ್ಕದ್ದು. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಅಂಡಾಕೃತಿಯಲ್ಲದ ಬೇರೆ ಯಾವುದೇ ಸ್ಥಳದಲ್ಲಿ ಉತ್ತರವನ್ನು ಗುರುತಿಸಿದರೆ, ಅದರ ಮೌಲ್ಯಮಾಪನ ಮಾಡಲಾಗುವುದಿಲ್ಲ.
6. OMR ಉತ್ತರ ಹಾಳೆಯಲ್ಲಿ ಕೊಟ್ಟ ಸೂಚನೆಗಳನ್ನು ಜಾಗರೂಕತೆಯಿಂದ ಓದಿರಿ.
7. ಎಲ್ಲಾ ಕರಡು ಕೆಲಸವನ್ನು ಪುಸ್ತಕಿಯ ಕೊನೆಯಲ್ಲಿ ಮಾಡತಕ್ಕದ್ದು.
8. ನಿಮ್ಮ ಗುರುತನ್ನು ಬಹಿರಂಗಪಡಿಸಬಹುದಾದ ನಿಮ್ಮ ಹೆಸರು ಅಥವಾ ಯಾವುದೇ ಚಿಹ್ನೆಯನ್ನು ಸಂಗತವಾದ ಸ್ಥಳ ಹೊರತು ಪಡಿಸಿ, OMR ಉತ್ತರ ಹಾಳೆಯ ಯಾವುದೇ ಭಾಗದಲ್ಲಿ ಬರೆದರೆ, ನೀವು ಅನರ್ಹತೆಗೆ ಬಾಧ್ಯರಾಗಿರುತ್ತೀರಿ.
9. ಪರೀಕ್ಷೆಯು ಮುಗಿದನಂತರ, ಕಡ್ಡಾಯವಾಗಿ OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ಸಂವೀಕ್ಷಕರಿಗೆ ನೀವು ಹಿಂತಿರುಗಿಸಬೇಕು ಮತ್ತು ಪರೀಕ್ಷಾ ಕೋಶದ ಹೊರಗೆ OMR ನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ಕೊಂಡೊಯ್ಯಕೂಡದು.
10. ಪರೀಕ್ಷೆಯ ನಂತರ, ಪರೀಕ್ಷಾ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಯನ್ನು ಮತ್ತು ನಕಲು OMR ಉತ್ತರ ಹಾಳೆಯನ್ನು ನಿಮ್ಮೊಂದಿಗೆ ತೆಗೆದುಕೊಂಡು ಹೋಗಬಹುದು.
11. ನೀಲಿ/ಕಪ್ಪು ಬಾಲ್ ಪಾಯಿಂಟ್ ಪೆನ್ ಮಾತ್ರವೇ ಉಪಯೋಗಿಸಿರಿ.
12. ಕ್ಯಾಲ್ಕುಲೇಟರ್ ಅಥವಾ ಲಾಗ್ ಟೇಬಲ್ ಇತ್ಯಾದಿಯ ಉಪಯೋಗವನ್ನು ನಿಷೇಧಿಸಲಾಗಿದೆ.
13. ಸರಿ ಅಲ್ಲದ ಉತ್ತರಗಳಿಗೆ ಋಣ ಅಂಕ ಇರುವುದಿಲ್ಲ.
14. ಕನ್ನಡ ಮತ್ತು ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳ ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆಗಳಲ್ಲಿ ಯಾವುದೇ ರೀತಿಯ ವ್ಯತ್ಯಾಸಗಳ ಕಂಡುಬಂದಲ್ಲಿ, ಇಂಗ್ಲೀಷ್ ಆವೃತ್ತಿಗಳಲ್ಲಿರುವುದೇ ಅಂತಿಮವೆಂದು ಪರಿಗಣಿಸಬೇಕು.

Instructions for the Candidates

1. Write your roll number in the space provided on the top of this page.
2. This paper consists of fifty multiple-choice type of questions.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
(i) To have access to the Question Booklet, tear off the paper seal on the edge of the 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 pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.**
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.
Example :

A	B	C	D
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where (C) is the correct response.
5. Your responses to the questions are to be indicated in the **OMR Sheet kept inside the Paper I Booklet only**. If you mark at any place other than in the ovals in the Answer Sheet, it will not be evaluated.
6. Read the instructions given in OMR carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your name or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, you will render yourself liable to disqualification.
9. You have to return the test OMR Answer Sheet to the invigilators at the end of the examination compulsorily and must NOT carry it with you outside the Examination Hall.
10. You can take away question booklet and carbon copy of OMR Answer Sheet soon after the examination.
11. **Use only Blue/Black Ball point pen.**
12. **Use of any calculator or log table etc., is prohibited.**
13. **There is no negative marks for incorrect answers.**
14. **In case of any discrepancy found in the Kannada translation of a question booklet the question in English version shall be taken as final.**



12. Given below are some statements about the default (0-argument) constructor :

- I) Its return type is the type of the class.
- II) It has no return type.
- III) The programmer can define it, but the C++ language doesn't require this.
- IV) The programmer must define it.
- V) It is always defined by C++ if it isn't provided by the programmer.
- VI) It is sometimes, but not always, defined by C++ if it isn't provided by the programmer.

Which of the statements are true ?

- (A) I, III and V only
 - (B) I, II and VI only
 - (C) II and IV only
 - (D) II, III and VI only
13. When an ADT is implemented as a C++ class, which of the following should normally be true ?
- (A) Member functions are private, member variables are public.
 - (B) Member functions are public, member variables are private.
 - (C) Member functions as well as member variables are private.
 - (D) Member functions as well as member variables are public.
14. What is Shallow Copy ?
- (A) A Shallow Copy creates a copy of the dynamically allocated objects too
 - (B) A Shallow Copy creates a copy of the statically allocated object too
 - (C) A Shallow Copy just copies the value of the data as they are
 - (D) Both B) and C)

15. Assume that the random number generating function – $\text{rand}()$, returns an integer between 0 and 10000 (both inclusive). To randomly generate a number between a and b (both inclusive), use the expression

- (A) $\text{rand}() \% (b - a)$
- (B) $(\text{rand}() \% a) + b$
- (C) $(\text{rand}() \% (b - a)) + a$
- (D) $(\text{rand}() \% (b - a + 1)) + a$

16. Logical data independence in the three-schema architecture means :

- 1) The capacity to change the conceptual schema without having to change external schema or application programs.
- 2) The capacity to change the internal schema without having to change the conceptual schema.

Which of the following statement is true about the logical data independence :

- (A) Both statements, 1) and 2) are true
- (B) Neither statement 1) nor statement 2) is true
- (C) Only statement 2) is true
- (D) Only statement 1) is true

17. A key K of a relation schema R is :

- 1) A superkey of R.
- 2) Removing any attribute A from K leaves a set of attributes K' that is not a superkey of R.

Which one of the following is correct about a key ?

- (A) Only statement 1) need to be satisfied
- (B) Only statement 2) need to be satisfied
- (C) Both statement 1) and 2) need to be satisfied
- (D) Neither statement 1) nor statement 2) need to be satisfied



18. From the following statements :

- 1) A superkey SK defines a uniqueness constraint that no two distinct tuples in any state r of R can have the same value for SK.
- 2) A relation schema may have more than one key. In such a case, each of the keys is called a candidate key.
- 3) A database state that does not obey all the integrity constraints is called an invalid state.

Which one of the following is correct ?

- (A) All statements are true
- (B) Statements 1) and 2) are true, but statement 3) is false
- (C) Statements 1) and 3) are true, but statement 2) is false
- (D) Statements 2) and 3) are true, but 1) is false

19. Note the following statements :

- 1) The insert operation can violate entity integrity constraint or referential integrity constraint.
- 2) The delete operation can violate only referential integrity.
- 3) Updating an attribute that is neither part of a primary key nor a foreign key usually causes no problems.

Which one of the following is correct about the statements ?

- (A) All statements are true
- (B) Statements 1) and 2) are true, but statement 3) is false
- (C) Statements, 2) and 3) are true, but statement 1) is false
- (D) Statements 1) and 3) are true, but statement 2) is false

20. 'A' in the ACID property of the Database Management System stands for

- (A) Accountability
- (B) Allowability
- (C) Accessibility
- (D) Atomicity

21. In a 2-dimensional matrix A , let m be the number of rows, n be the number of columns, ws be the word-size of the data item, lower bound of both row and column be 1 and let BA be the base-address of the matrix. If the matrix were to be stored using row-major representation, the memory location of the element $A(i, j)$ can be found using the formula

- (A) $BA + [(m - 1) * i + j] * ws$
- (B) $BA + [(m * i) + (j - 1)] * ws$
- (C) $BA + [(n * (i - 1)) + j] * ws$
- (D) $BA + [(n * (i - 1)) + (j - 1)] * ws$

22. In a Binary Tree, if the inorder and preorder traversing result in the sequence 5, 4, 6, 7, 8, 3 and 7, 4, 5, 6, 8, 3 respectively, the post-order traversing sequence is

- (A) 5, 6, 4, 8, 3, 7
- (B) 5, 6, 4, 3, 8, 7
- (C) 5, 6, 4, 7, 3, 8
- (D) 5, 6, 7, 4, 3, 8

23. The Quick sort algorithm :

- 1) Worst case complexity is $O(n^2)$
- 2) Average case complexity is $O(n \log_2 n)$
- 3) Performs badly when input elements are given in sorted order
- 4) Pivot element always divides the elements into two equal sized sub-arrays

Which of the following option are correct ?

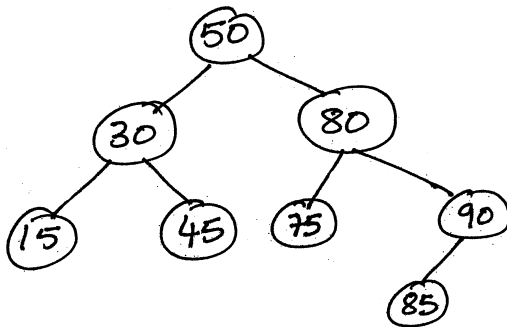
- (A) Statements 1), 2) and 4) are true, but statement 3) is false
- (B) Statements 1), 2) and 3) are true, but statement 4) is false
- (C) Statements 1) and 2) are true, but statements 3) and 4) are false
- (D) All statements are true



24. Strassen's matrix multiplication algorithm :

- 1) Complexity is $O(n^3)$
 - 2) Complexity is $O(n^{\log_2 7})$
 - 3) Decreases number of multiplication compared to traditional multiplication algorithm
 - 4) Uses divide and conquer technique
- Which of the following option is correct ?
- (A) Statements 2), 3) and 4) are true, but statement 1) is false
 - (B) Statements 1), 3) and 4) are true, but statement 2) is false
 - (C) Statements 2) and 4) are true, but statements 1) and 3) are false
 - (D) Statements 2) and 3) are true, but statements 1) and 4) are false

25. Consider the following Binary Search Tree :



If we delete the element 50, which element will replace the element 50 in the tree ?

- (A) 45
- (B) 75
- (C) Either 45 or 75
- (D) Neither 45 nor 75

26. Consider the coding scheme for error correction in the following table :

Dataword	Codeword
00	00000
01	01011
10	10101
11	11110

The minimum Hamming distance of the coding scheme is

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

27. What do routers use to segment LANs ?

- (A) SNAP
- (B) Logical addresses
- (C) MAC addresses
- (D) CDP

28. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all systems together) produces 1000 frames per second ?

- (A) 50
- (B) 135
- (C) 200
- (D) 270

29. A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle ?

- (A) 256
- (B) 1024
- (C) 256×256
- (D) 4096

30. Suppose that the TCP congestion window is set to 18 KB and a timeout occurs. How big will the window be if the next four transmission bursts are all successful ? Assume that the maximum segment size is 1 KB.

- (A) 1 KB
- (B) 2 KB
- (C) 4 KB
- (D) 8 KB

31. Consider the grammar :

- $S \rightarrow ABSc/Abc$
- $BA \rightarrow AB$
- $Bb \rightarrow bb$
- $Ab \rightarrow ab$
- $Aa \rightarrow aa$

Which of the following sentences can be derived by this grammar ?

- (A) abc
- (B) aab
- (C) abcc
- (D) abbc

32. Match all the items in Group 1 with correct options from those given in Group 2 :

- | Group 1 | Group 2 |
|------------------------|----------------------|
| P) Regular expression | 1) Syntax analysis |
| Q) Pushdown automata | 2) Code generation |
| R) Data flow analysis | 3) Lexical analysis |
| S) Register allocation | 4) Code optimization |
- (A) P - 4, Q - 1, R - 2, S - 3
 - (B) P - 3, Q - 1, R - 4, S - 2
 - (C) P - 3, Q - 4, R - 1, S - 2
 - (D) P - 2, Q - 1, R - 4, S - 3



33. YACC builds
(A) SLR parsing table
(B) Canonical LR parsing table
(C) LALR parsing table
(D) Operator-precedence
34. A shift reduce parser carries out the actions specified within braces immediately after reducing with the corresponding rule of grammar:
S → XXW {print "1"}
S → Y {print "2"}
W → SZ {print "3"}
What is the translation of XXXXYZZ using the syntax directed translation scheme described by the above rules ?
(A) 23131 (B) 11233
(C) 11231 (D) 33211
35. Recursive descent parsing is an example of
(A) Top-down parsers
(B) Bottom-up parsers
(C) Predictive parsing
(D) Both A) and C)
36. What is the main difference between traps and interrupts ?
(A) How they are initiated
(B) The kind of code that is used to handle them
(C) Whether or not the scheduler is called
(D) How the operating system returns from them
37. Once a program is compiled, it can be loaded for execution
(A) Only from the compiler generated starting address
(B) Anywhere in the main memory
(C) User needs to specify where the compiled code is to be loaded
(D) It is loaded starting from address 0 in the main memory
38. What is the mechanism used to describe deadlocks ?
(A) Precedence graph
(B) Process state diagram
(C) Resource allocation problem
(D) Process control block
39. In Unix ls command, option-u indicates
(A) Prints in time sorted order
(B) Prints the access time instead of modification time
(C) Prints the modification time instead of access time
(D) Prints the file size sorted order
40. The following program :
main ()
{
if (fork () > 0)
sleep (100) ;
}
results in the creation of
(A) An orphan process
(B) A zombie process
(C) A process that executes forever
(D) None of the above
41. A graphic representation of an information system is called
(A) Flowchart
(B) Pictogram
(C) Data Flow Diagram
(D) Histogram
42. A company needs to develop software for one of the University. The software is expected to have 90000 lines of code. The multiplicative factor for this model is given as 3.6 for the software development on embedded system, while the exponentiation factor is given as 1.20. What is the estimated effort in Person-Months ?
(A) 324 (B) 388.8
(C) 796.88 (D) 726.88
43. Let us consider the following C program. Estimate the program volume using Halstead Method :
main ()
{
int a, b, c, avg;
scanf ("%d %d %d", &a, &b, &c);
avg = (a + b + c)/3 ;
printf("Average = %d", avg);
}
(A) 370 (B) 320
(C) 346 (D) 366



44. _____ is a Black Box testing method.
- (A) Boundary Value Analysis
 - (B) Basic path testing
 - (C) Code path analysis
 - (D) Top-down testing
45. What is the appropriate pairing of items in the two columns listing various activities encountered in a software life cycle ?
- | List – I | List – II |
|-------------------------|--|
| P) Requirements capture | 1) Module development and integration |
| Q) Design | 2) Domain analysis |
| R) Implementation | 3) Structural and behavioural modeling |
| S) Maintenance | 4) Performance tuning |
- (A) P – 3, Q – 2, R – 4, S – 1
 - (B) P – 2, Q – 3, R – 1, S – 4
 - (C) P – 3, Q – 2, R – 1, S – 4
 - (D) P – 2, Q – 3, R – 4, S – 1
46. Which Act among the following gave legal validity to the electronic-commerce (e-commerce) in India ?
- (A) Company Act
 - (B) Consumer Protection Act
 - (C) IT Act
 - (D) Cyber Act
47. Amdahl's law broadly related to the following issue.
- (A) Instruction stream and data stream
 - (B) Doubling of computers performance every eighteen months
 - (C) Memory hierarchy
 - (D) Bottleneck of sequential code for parallel processing
48. Assume that a mobile service provider is allocated 124 slots in a Country. The frequency slots are in the uplink frequency range :
- Ch₁ : 890 MHz ± 100 KHz
Ch₂ : 890.2 MHz ± 100 KHz
and so on till
Ch₁₂₄ : 915 MHz ± 100 KHz.
What is the spectrum allocated ?
- (A) 890 MHz
 - (B) 100 KHz
 - (C) 915 MHz
 - (D) 25 MHz
49. The values for a given set of data are grouped into intervals. The intervals and corresponding frequencies are as follows :
- | Age | Frequency |
|----------|-----------|
| 1 – 5 | 200 |
| 5 – 15 | 450 |
| 15 – 20 | 300 |
| 20 – 50 | 1500 |
| 50 – 80 | 700 |
| 80 – 110 | 44 |
- Compute an approximate median value for the data.
- (A) 36.4 years
 - (B) 32.94 years
 - (C) 28.6 years
 - (D) 16.7 years
50. A dishonest casino uses a fair die most of the time. However, it switches to a loaded die with a probability of 0.05 and switches back to the fair die with a probability 0.10. The fair die has a probability of $\frac{1}{6}$ of rolling any number.
- The loaded die has $P(1) = P(2) = P(3) = P(4) = P(5) = 0.10$ and $P(6) = 0.50$. Calculate Emission probabilities for Fair (F) and Loaded (L) states.
- (A) (2, 3)
 - (B) $\left(\frac{1}{6}, 0.5\right)$
 - (C) (3, 2)
 - (D) (4, 5)



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Space for Rough Work