VERSION CODE	Maximum Marks : 100 Total Duration : 150 Minutes Maximum Time For Answering : 120 Minutes Subject : **MCA**	Serial Number : 162121
A1	MENTION YOUR PGCET NUMBER	Subject Code **P-MCA**

P-MCA A1

DOs:

1. This question booklet is issued to you by the invigilator **after 10.20 am.**
2. Check whether the PGCET Number has been entered and shaded in the respective circles on the OMR answer sheet.
3. The version code and serial number of this question booklet should be entered on the OMR answer sheet and the respective circles should also be shaded completely.
4. The Version Code and Serial Number of this question booklet should be entered on the Nominal Roll without any mistakes.
5. Compulsorily sign at the bottom portion of the OMR answer sheet in the space provided.

DON'Ts:

1. **The timing and marks printed on the OMR answer sheet should not be damaged / mutilated / spoiled.**
2. **The 3rd Bell rings at 10.30 am., till then;**
   - Do not remove the seal present on the right hand side of this question booklet.
   - Do not look inside this question booklet or start answering on the OMR answer sheet.

IMPORTANT INSTRUCTIONS TO CANDIDATES

1. In case of usage of signs and symbols in the questions, the regular textbook connotation should be considered unless stated otherwise.
2. This question booklet contains 80 questions and each question will have one statement and four different options / responses & out of which you have to choose one correct answer.
3. After the 3rd Bell is rung at 10.30 am., remove the paper seal on the right hand side of this question booklet and check that this booklet does not have any unprinted or torn or missing pages or items etc., if so, get it replaced by a complete test booklet. Read each item and start answering on the OMR answer sheet.
4. Completely **darken / shade** the relevant circle with a **blue** or **black ink ballpoint pen against the question number on the OMR answer sheet.**

ಸರಿಯಾದ ಕ್ರಮ CORRECT METHOD	ತಪ್ಪು ಕ್ರಮಗಳು WRONG METHOD
(A) ● (C) (D)	⊗ (B) (C) (D) (A) (B) (C) ⊘ (A) ● ● (D) ◐ (B) (C) (D) (A) ◉ (C) (D)

5. Please note that even a minute unintended ink dot on the OMR answer sheet will also be recognized and recorded by the scanner. Therefore, avoid multiple markings of any kind on the OMR answer sheet.
6. Use the space provided on each page of the question booklet for Rough Work. Do not use the OMR answer sheet for the same.
7. **Last bell will ring at 12.30 pm.**, stop marking on the OMR answer sheet.
8. Hand over the **OMR answer sheet** to the room invigilator as it is.
9. After separating the top sheet (KEA copy), the invigilator will return the bottom sheet replica (candidate's copy) to you to **carry home for self-evaluation.**

Marks Distribution	PART-1 : 60 QUESTIONS CARRY ONE MARK EACH (1 TO 60)
	PART-2: 20 QUESTIONS CARRY TWO MARKS EACH (61 TO 80)

MCA

PART-1

Each question carries one mark. **(60 × 1 = 60)**

1. The least integral value of k for which $(k-2)x^2 + 8x + k + 4 \geq 0$ for all $x \in R$, is

   (A) 5

   (B) 4

   (C) 3

   (D) 0

2. If $4 \leq x \leq 9$ then which of the following is true?

   (A) $(x-4)(x-9) < 0$

   (B) $(x-4)(x-9) > 0$

   (C) $(x-4)(x-9) \leq 0$

   (D) $(x-4)(x-9) \geq 0$

3. If $\log_2 x + \log_4 x + \log_{16} x = \frac{21}{4}$, then the value of x is

   (A) 8

   (B) 4

   (C) 2

   (D) 16

4. Which of the following cannot be the order of the power set of a finite set?

   (A) 8

   (B) 16

   (C) 32

   (D) 12

5. In a certain town 25% of families own a cell phone, 15% of families own a car and 65% of families own neither a cell phone nor a car. If 500 families own both cell phone and car, then the total number of families in the town is

   (A) 10000

   (B) 20000

   (C) 30000

   (D) 40000

6. If H is the harmonic mean between a and b then value of $\frac{H}{a} + \frac{H}{b}$ is

   (A) 2

   (B) $\frac{ab}{a+b}$

   (C) $\frac{a+b}{ab}$

   (D) none of these

7. If equations $x^2 + ax + b = 0$ and $x^2 + bx + a = 0$ have a common root, then the numerical value of $a + b$ is

   (A) 1

   (B) 0

   (C) –1

   (D) 2

Space For Rough Work

8. The total number of permutations of 4 letter words that can be made out of letters of the word EXAMINATION is

(A) 2454

(B) 2545

(C) 2436

(D) 2346

9. If A is an orthogonal matrix then which of the following is true?

(A) $|A| = 0$

(B) $|A| = \pm 1$

(C) $|A| = \pm 2$

(D) none of these

10. The value of determinant $\begin{vmatrix} 11 & 12 & 13 \\ 12 & 13 & 14 \\ 13 & 14 & 15 \end{vmatrix}$ is

(A) 0

(B) 1

(C) –1

(D) 2

11. India plays two matches each with West Indies and Australia. In any match the probabilities of India getting points 0, 1 and 2 are 0.45, 0.05 and 0.50 respectively. Assuming the outcomes are independent the probability of India getting at least 7 points is

(A) 0.875 (B) 0.0875

(C) 0.0625 (D) 0.025

12. A circle touches the x–axis and also touches circle with centre (0,3) and radius 2. The locus of the center of the circle is

(A) a circle

(B) a parabola

(C) an ellipse

(D) a hyperbola

13. The eccentricity of the conic $4x^2 + 16y^2 - 24x - 32y = 1$ is

(A) 0.5 (B) $\sqrt{3}$

(C) $\frac{\sqrt{3}}{2}$ (D) $\frac{\sqrt{3}}{4}$

14. The value of $\tan 1^0 \times \tan 2^0 \times \tan 3^0 \times \ldots\ldots \times \tan 89^0$ is

(A) 1 (B) 0 (C) ∞ (D) 0.5

The value of $\lim_{x \to \infty} \frac{1 + \sin x - \cos x + \log(1 - x)}{x^3}$ is

(A) 0.5 (B) –0.5

(C) 0 (D) 1

15. Find the probability that a non-defective bolt will be found if out of 600 bolts already examined, 12 were defective.

(A) 0.98 (B) 1.0204

(C) 0.02 (D) None of these

16. If $A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & -5 & 0 \\ 1 & 2 & 1 \end{bmatrix}$, then trace of A is

(A) 7 (B) – 5

(C) 3 (D) – 3

Space For Rough Work

17. If a square matrix A is orthogonal as well as symmetric then

(A) A is involutory matrix

(B) A is idempotent matrix

(C) A is diagonal matrix

(D) None of these

18. If $\sin^{-1}(1-x) - 2\sin^{-1}x = \frac{\pi}{2}$ then the value of x is

(A) −0.5 (B) 0.5

(C) 1 (D) 0

19. If $\log_3 y = x$ and $\log_2 z = x$, then 72^x is equal to

(A) $y^2 z^3$ (B) $y^3 z^2$

(C) $y^2 z^2$ (D) yz

20. The value of $\lim_{x \to 1} (1-x^2)^{\frac{1}{\log(1-x)}}$ is

(A) 1 (B) e

(C) 0 (D) − 1

21. The value of $\frac{\tan 60 - \tan 30}{1 + \tan 60 \tan 30}$ is

(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$

(C) $-\frac{1}{\sqrt{3}}$ (D) 0

22. If the matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is commutative with matrix $\begin{bmatrix} 1 & 1 \\ 0 & 1 \end{bmatrix}$

(A) a = 0, b = c (B) b = 0, c = d

(C) c = 0, d = a (D) d = 0, a = b

23. If $A = \begin{bmatrix} \cos\theta & -\sin\theta \\ \sin\theta & \cos\theta \end{bmatrix}$ then which of the following is not correct?

(A) A is orthogonal matrix

(B) A' is orthogonal matrix

(C) determinant (A) = 1

(D) A is not invertible

24. The value of $\left[\frac{1}{\log_2 64} + \frac{1}{\log_8 64} + \frac{1}{\log_4 64}\right]$ is

(A) 1 (B) 14

(C) 64 (D) 0

25. If $A = \begin{bmatrix} 1 & 2 & x \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & -2 & y \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ and $AB = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$ then the value of x + y is

(A) 0 (B) 1

(C) −1 (D) 2

Space For Rough Work

26. Find all t such that $\begin{vmatrix} t-4 & 3 \\ 2 & t-9 \end{vmatrix} = 0$ is

(A) 3 & 10 (B) –3 & –10

(C) –3 & 10 (D) 3 & –10

27. The system of equations $kx + y + z = 1$, $x + ky + z = k$, $x + y + kz = k^2$ have no solution if k equals to

(A) 1 (B) 0

(C) – 2 (D) – 1

28. If $5x^2 + \lambda y^2 = 20$ represents the rectangular hyperbola, then λ equals to

(A) 5 (B) 4

(C) – 5 (D) 2

29. If x, y, z are G.P. and $a^x = b^y = c^z$ then which of the following is correct?

(A) $\log_b a = \log_a c$

(B) $\log_c b = \log_a c$

(C) $\log_b a = \log_c b$

(D) none of these

30. The ROM chips are mainly used to store_____

(A) System files

(B) Root directories

(C) Driver files

(D) Boot files

31. Different characters that can be encoded is 2n, where n is the representation of

(A) number of bytes for each character

(B) number of mega bytes

(C) number of bits for each character

(D) none of the above

32. How many characters does ASCII include?

(A) 128 (B) 1600

(C) 64 (D) 32

33. Which of the following is often called the double precision format?

(A) 32-bit (B) 8-bit

(C) 64-bit (D) 128-bit

34. The octal equivalent of the binary number $(110010010100)_2$ is _____

(A) 1422 (B) 3242

(C) 6224 (D) 6226

35. The time interval from the submission of a job to its processing completion defines its

(A) Response time

(B) Access time

(C) Turnaround time

(D) Throughput

36. The communication protocol used by internet is

(A) HTTP (B) WWW

(C) FTP (D) TCP/IP

Space For Rough Work

37. HTML is used to create

(A) machine language program

(B) high level program

(C) web server

(D) web page

38. Micro-programmed control unit is

(A) faster than hard-wired unit

(B) slower than hard-wired unit

(C) to facilitate easy implementation of new instructions

(D) Both (B) and (C)

39. Which of the following is designed to control the operations of a computer?

(A) Application Software

(B) Utility Software

(C) System Software

(D) User

40. Word processing software is a type of

(A) Synchronous Software

(B) Package Software

(C) Application Software

(D) System Software

41. _____ Operating system does not implement multitasking.

(A) Windows 98

(B) MS DOS

(C) Windows NT

(D) Windows XP

42. Which one of the following errors will be handled by the operating system?

(A) power failure

(B) lack of paper in printer

(C) connection failure in the network

(D) all of the mentioned

43. A process can be terminated due to _____

(A) normal exit

(B) fatal error

(C) killed by another process

(D) all of the mentioned

44. A system is in the safe state if _____

(A) the system can allocate resources to each process in some order and still avoid a deadlock

(B) there exists a safe sequence

(C) all of the mentioned

(D) none of the mentioned

Space For Rough Work

Read the following passage and answer the questions from 45 to 49 based on the passage.

The law in many parts of the world increasingly restricts the discharge of agricultural slurry into watercourses. The simplest and often the most economically sound practice returns the material to the land as semi-solid manure or as sprayed slurry. This dilutes its concentration in the environment to what might have occurred in a more primitive and sustainable type of agriculture and converts pollutant into fertilizer. Soil micro organisms decompose the organic components of sewage and slurry and most of the mineral nutrients become available to be absorbed again by the vegetation.

The excess input of nutrients, both nitrogen and phosphorous-based from agricultural runoff (and human sewage) has caused many 'healthy' oligotrophic lakes (low nutrient concentrations, low plant productivity with abundant water weeds and clear water) to change to eutrophic condition where high nutrient inputs lead to high phytoplankton productivity (sometimes dominated by bloom-forming toxic species). This makes the water turbid, eliminates large plants and in the worst situations, leads to anoxia and fish kills; so called cultural eutrophication. Thus, important ecosystem services are lost, including the provisioning service of wild-caught fish and the cultural services associated with recreation.

The process of cultural eutrophication of lakes has been understood for sometime. But only recently did scientists notice huge 'dead zones' in the oceans near river outlets, particularly those draining large catchment areas such as the Mississippi in North America and the Yangtze in China. The nutrient-enriched water flows through streams, rivers and lakes, and eventually to the estuary and ocean where the ecological impact may be huge, killing virtually all invertebrates and fish in areas up to 70,000 Km^2 in extent. More than 150 sea areas worldwide are now regularly starved of oxygen as a result of decomposition of algal blooms, fuelled particularly by nitrogen from agricultural runoff of fertilizers and sewage from large cities. Oceanic dead zones are typically associated with industrialized nations and usually lie off' – countries that subsidize their agriculture, encouraging farmers to increase productivity and use more fertilizer.

45. According to the passage, why should the discharge of agricultural slurry into watercourses be restricted?

    1. Losing nutrients in this way is not a good practice economically.
    2. Watercourses do not contain the micro organisms that can decompose organic components of agricultural slurry.
    3. The discharge may lead to the eutrophication of water bodies.

    Select the correct answer using the codes given below

    (A) 1 only

    (B) 2 and 3 only

    (C) 1 and 3 only

    (D) 1, 2 and 3

Space For Rough Work

46. The passage refers to the conversion of "pollutant to fertilizer". What is pollutant and what is fertilizer in this context?

(A) Decomposed organic component of slurry is pollutant and micro organisms in soil constitute fertilizer.

(B) Discharged agricultural slurry is pollutant and decomposed slurry in soil is fertilizer.

(C) Sprayed slurry is pollutant and watercourse is fertilizer.

(D) None of the above expressions is correct in this context.

47. According to the passage, what are the effects of indiscriminate use of fertilizers?

1. Addition of pollutants to the soil and water.
2. Destruction decomposer of micro organisms in soil.
3. Nutrient enrichment of water bodies
4. Creation of algal blooms.

Select the correct answer from the codes given below:

(A) 1, 2 and 3 only

(B) 1, 3 and 4 only

(C) 2 and 4 only

(D) 1, 2, 3 and 4

48. What is/are the characteristics of a water body with cultural eutrophication?

1. Loss of ecosystem services
2. Loss of flora and fauna
3. Loss of mineral nutrients

Select the correct answer using the code given below;

(A) 1 only

(B) 1 and 2 only

(C) 2 and 3 only

(D) 1, 2 and 3

49. What is the central theme of this passage?

(A) Appropriate legislation is essential to protect the environment.

(B) Modern agriculture is responsible for the destruction of environment.

(C) Improper waste disposal from agriculture can destroy the aquatic ecosystems.

(D) Use of chemical fertilizers is undesirable in agriculture.

50. Choose that word which can substitute the underlined words in both the sentences.

I. Srinath cannot <u>endure</u> such a loud noise anymore

II. He preferred to consider the other <u>view</u>

(A) Bear (B) Support

(C) Position (D) Stand

Space For Rough Work

51. Recently 'LIBRA' term has been in news. It is -_____

(A) Spyware associated with computers

(B) New space object found by NASA

(C) Recently tested ballistic missile by USA

(D) New crypto currency developed by Facebook

52. Consider the following statements about WORLD ANTI-DOPING AGENCY.

1. WADA was set up as a foundation under the initiative of the International Olympic Committee.
2. India is a signatory to the Convention.
3. UNESCO's International Convention against Doping in Sport helps in ensuring the effectiveness of the code.

Which of the above given statements are correct?

(A) 1 and 2 (B) 1 and 3

(C) 2 and 3 (D) All of the above

53. Which of the following is not matched correctly?

(A) Pankaj Advani : Billiards

(B) Anjali Bhagwat : Shooting

(C) Muhammed Anas Yahijya: Boxing

(D) Deepa Malik : Athletics

54. What are PLOONETS?

(A) New class of celestial objects.

(B) New security feature against cyber crimes.

(C) Type of fishing nets which are environment friendly.

(D) Type of animals living at the surface of oceans.

55. UTKARSH 2022 is launched by

(A) Ministry of Rural Development

(B) NITI Aayog

(C) RBI

(D) Ministry of Women and Child Development

56. Consider the following statements about NEUTRINO:

1. It is an elementary particle, which is electrically neutral and has no mass.
2. It is the second most abundant particle in the universe after photons.
3. India–based Neutrino Observatory (INO) is an upcoming project to study neutrinos.

Which of the above statements are correct?

(A) 1, 2 & 3

(B) 2 & 3 only

(C) 1 & 3 only

(D) 1 & 2 only

Space For Rough Work

57. Consider the following statements about tropical cyclones:

1. The temperature of the top layer of the sea needs to be at least 28°C to support the formation of a Cyclone.
2. The low level of air above the waters needs to have 'clockwise' rotation in the northern hemisphere

Which of the statements given above is / are correct?

(A) 1 only

(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

58. Consider the following statements regarding GRAVITATIONAL WAVES

1. These are ripples in the fabric of space– time caused by collision between neutron stars or merger of black holes.
2. Gravitational waves are yet to be detected by scientists.

Which of the above statements is / are correct?

(A) 1 only

(B) 2 only

(C) Both 1 and 2

(D) Neither 1 nor 2

59. Which of the following statements regarding Majuli are incorrect?

1. It is the largest uninhabited riverine island in the world
2. It faces a grave threat due to erosion by the river

Choose the correct option:

(A) Only 1

(B) Only 2

(C) Both

(D) None

60. Baba Budan, the Sufi who is credited with first bringing the Coffee beans to Chikmagalur, is believed to have brought these beans from

(A) Ethiopia

(B) Brazil

(C) Yemen

(D) Saudi Arabia

Space For Rough Work

PART-2

Each question carries two marks. **(20 × 2 = 40)**

61. The value of

$$3\log\left(\frac{81}{80}\right)+5\log\left(\frac{52}{24}\right)+7\log\left(\frac{16}{15}\right)$$ is

(A) 1

(B) 0

(C) log2

(D) log3

62. The sum of integers from 1 to 100 which are not divisible by 3 or 5 is

(A) 2489

(B) 4735

(C) 2632

(D) 2317

63. If 7 points out of 12 points are on same straight line then the number of triangles formed is

(A) 190

(B) 158

(C) 185

(D) 201

64. The coefficient of x^5 in the expansion $(1+x^2)^5(1+x)^4$ is

(A) 30

(B) 60

(C) 40

(D) 45

65. Let $A=\begin{bmatrix}1 & 2\\ -5 & 1\end{bmatrix}$ and $A^{-1}=xA+yI$, then the value of x and y are

(A) $x=-\frac{1}{11}, y=\frac{2}{11}$

(B) $x=-\frac{1}{11}, y=-\frac{2}{11}$

(C) $x=\frac{1}{11}, y=\frac{2}{11}$

(D) $x=\frac{1}{11}, y=-\frac{2}{11}$

66. If a circle passes through the points of intersection of the coordinate axes with lines $\lambda x - y + 1 = 0$ and $x - 2y + 3 = 0$ then the value of λ is

(A) 2, $\frac{1}{3}$

(B) $\frac{1}{3}$, 1

(C) 6

(D) 3

67. $\dfrac{\sin 7\theta + 6\sin 5\theta + 17\sin 3\theta + 12\sin\theta}{\sin 6\theta + 5\sin 4\theta + 12\sin 2\theta}$

equals to

(A) $2\cos\theta$

(B) $\cos\theta$

(C) $2\sin\theta$

(D) $\sin\theta$

Space For Rough Work

68. Hexadecimal addition of $(3A6)_{16}$ and $(1B2)_{16}$ will give:

(A) 516 (B) 385

(C) 818 (D) 558

69. The result obtained on binary multiplication of 1010*1100 is _____

(A) 0001111

(B) 1111000

(C) 1111100

(D) 0011111

70. Subject (subject _id, sec_id, semester)

Here the subject course_id, sec_id and semester are _____ and course is a _____

(A) Relations, Attribute

(B) Tuple, Attributes

(C) Tuple, Relation

(D) Attributes, Relation

71. SELECT * FROM employee WHERE salary>25000 AND dept_id = 100;

(A) Salary, dept_id

(B) Salary

(C) Employee

(D) All the fields of employee relation

72. For a numerically controlled machine, integers need to be stored in a memory location. The minimum number of bits needed for an integer word to represent all integers between 0 and 1024 is

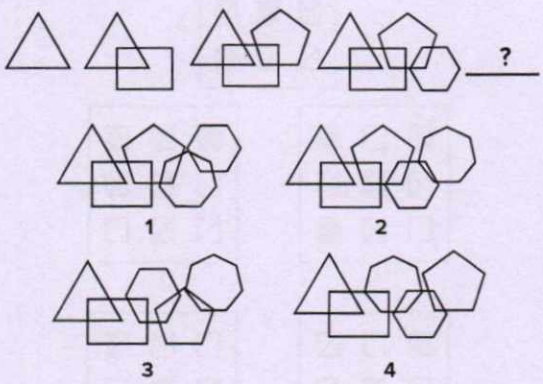
(A) 9

(B) 8

(C) 11

(D) 10

73. The series of figures which are given is incomplete. Select the correct figure from the options which comes next in this series.



(A) 1 (B) 2

(C) 3 (D) 4

74. In a certain code language FOUR is coded as EGNPTVQS, then code for EIGHT is

(A) DF HJ HF SU GH

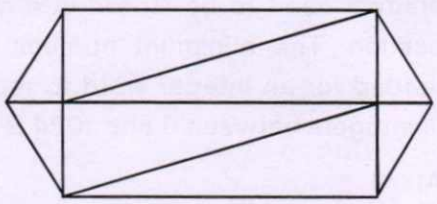
(B) DF HJ HF GH SU

(C) DF HJ FH HG SU

(D) DF HJ FH GH SU

Space For Rough Work

75. The number of triangles in the given figure is



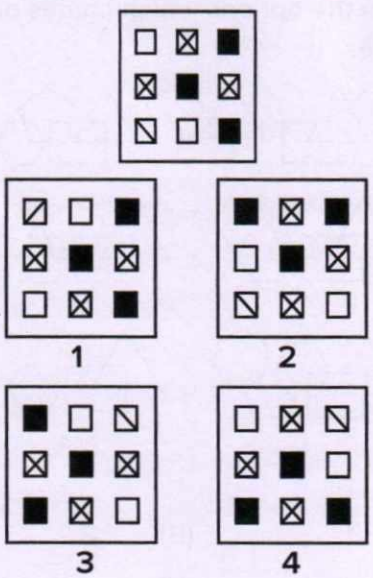
(A) 8 or less than 8

(B) 9

(C) 10

(D) 11 or more than 11

76. Which figure is identical to the first?



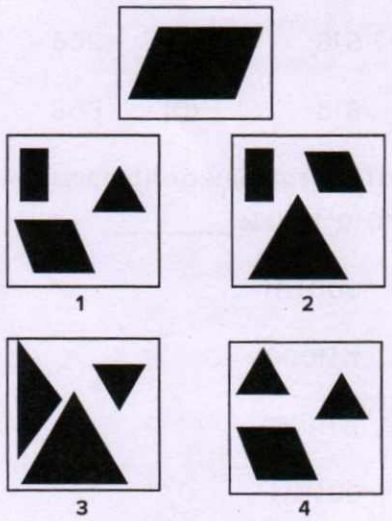
(A) • 1

(B) • 2

(C) • 3

(D) • 4

77. Which group of shapes can be assembled to make the shape shown?



(A) • 1

(B) • 2

(C) • 3

(D) • 4

78. Choose the one which best expresses the meaning of the given idiom /proverb.

By the skin of one's teeth

(A) Hardly

(B) Hurriedly

(C) In time

(D) Only just

Space For Rough Work

79. Choose the most suitable 'one word' for the given words / sentence.

A hiding place or a place where goods are hidden.

(A) Creche

(B) Drey

(C) Cache

(D) Granary

80. Which of the following is/are correct?

(i) Satya Nadella is CEO of Google.

(ii) Robert (Bob) Swan is CEO of Intel Corporation.

(iii) Sundar Pichai is CEO of Microsoft.

(A) Only (i) & (iii)

(B) Only (ii) and (iii)

(C) Only (ii)

(D) None of the above

Space For Rough Work

SPACE FOR ROUGH WORK