JEE Main 2021 Paper 2B (B.Planning) Sep 9 Shift 2 Question Paper

Conducted by the National Testing Agency (NTA)

Time Allowed: 3 Hours **B.Planning** **Maximum Marks: 400**

General Instructions

(i) This is **Paper 2B (B.Planning)** of **JEE (Main) 2021**, conducted by the National Testing Agency on **9 Sep 2021**.

(ii) The paper contains **105 questions**; attempt **100** as specified in the section table. The maximum score is **400 marks**.

(iii) Multiple choice questions have four options. Select one answer. Each correct answer carries **4 marks**; an incorrect answer carries **−1 mark**.

(iv) Numerical value questions carry **4 marks** for a correct answer and **0 marks** for an incorrect answer. Unanswered questions carry **0 marks**.

(v) All Planning and Aptitude Test questions are compulsory.

(vi) In Mathematics Section B, attempt **any five of the ten** numerical value questions.

Section	Questions	To attempt	Marks
Mathematics Section A	20	20	80
Mathematics Section B	10	5	20
Aptitude Test	50	50	200
Planning	25	25	100

Mathematics Section A

1. 4 marks

The domain of the function

$$f(x)=\frac{\sqrt{2x-1}}{\sqrt{3-4x}\sqrt{4-5x}}\cdot\log_{12}\left(\frac{x+3}{x+5}\right) \text{ is}$$

(1) $\left[\frac{1}{2},\frac{3}{5}\right]$

(2) $\left[\frac{1}{2},\frac{4}{5}\right)$

(3) $\left(\frac{1}{2},\frac{7}{8}\right)$

(4) $\left[\frac{1}{2},\frac{3}{4}\right)$

2. 4 marks

If $\alpha, \beta \in \mathbb{C}$ are the distinct roots of the equation $x^2+\left(\sqrt{2}\right)x+2=0$, then $\alpha^{11}+\beta^{11}$ is equal to

(1) 16

(2) $-16\sqrt{2}$

(3) $32\sqrt{2}$

(4) $-32\sqrt{2}$

3. 4 marks

If $A=\begin{bmatrix} a_1 & a_2 & a_3 \\ a_4 & a_5 & a_6 \\ a_7 & a_8 & a_9 \end{bmatrix}$ where $a_1, a_2, a_3, \ldots$ form a G.P. with common ratio $r>1$, then the entries in each column of A^5 from a G.P. with common ratio

(1) r

(2) r^2

(3) r^3

(4) r^5

4. 4 marks

If the system of linear equations

$2x+3y-2z=0\,;2x-y+3z=0\,;7x+\lambda y-z=0$ has a non-zero solution (x, y, z), then $\frac{xz}{y^2}$ is equal to

(1) $\frac{-7}{8}$

(2) $\frac{5}{4}$

(3) $\frac{-14}{25}$

(4) $\frac{5}{16}$

5. 4 marks

The value of ${}^{40}C_{31}+\sum_{r=0}^{10}{}^{40+r}C_{10+r}$ is equal to

(1) ${}^{51}C_{20}$

(2) ${}^{50}C_{20}$

(3) $2\cdot{}^{45}C_{15}$

(4) ${}^{50}C_{19}$

6. 4 marks

If A is the sum of even terms and B that of odd terms in the G.P.

$8,\ 4\sqrt{3}\,,\ 6,\ 3\sqrt{3}\,,\ldots$ having 31 terms, then $\frac{A}{B}$ is equal to

(1) $\frac{2\sqrt{3}\left(4^{16}-3^{16}\right)}{4^{15}-3^{15}}$

(2) $\frac{4\left(4^{16}-3^{16}\right)}{4^{15}-3^{15}}$

(3) $\frac{4\left(4^{15}-3^{15}\right)}{4^{16}-3^{16}}$

(4) $\frac{2\sqrt{3}\left(4^{15}-3^{15}\right)}{4^{16}-3^{16}}$

7. 4 marks

Let $g=f^{-1}$ and $f'(x)=\frac{1}{1+x^3}$, $0<x<1$. Then $g'(x)$ is equal to

(1) $\left(1+\left(f(x)\right)^3\right)^{-1}$

(2) $\left(1+\left(g(x)\right)^3\right)^{-1}$

(3) $1+\left(g(x)\right)^3$

(4) $1+\left(f(x)\right)^3$

8. 4 marks

If tangents are drawn from (0, 0) to the curve $y = \cos x$, then the points of contact of the tangents lie on the curve

(1) $x^2 - y^2 = x^2y^2$

(2) $x^2 + y^2 = x^2y^2$

(3) $y^2 - x^2 = x^2y^2$

(4) $\left(1+x^2\right)y^2 = \left(1-y^2\right)x^2$

9. 4 marks

If one ant is moving along the curve $y = x^2$ and the other stays at the point (0, 1), then the shortest distance between the two ants is

(1) $\sqrt{2}$

(2) $\frac{1}{\sqrt{2}}$

(3) 1

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

10. 4 marks

The integral $\int\frac{-4\sin x+5\sin(2x)}{6\sin x-5\sin(2x)}dx$ is equal to

(where C is a constant of integration)

(1) $-x+\frac{1}{2}\log_e\left|\frac{2\sin\frac{x}{2}-\cos\frac{x}{2}}{2\sin\frac{x}{2}+\cos\frac{x}{2}}\right|+C$

(2) $-x+\frac{1}{2}\log_e\left|\frac{\sin\frac{x}{2}-\cos\frac{x}{2}}{\sin\frac{x}{2}+\cos\frac{x}{2}}\right|+C$

(3) $-x+\frac{1}{4}\log_e\left|\frac{2\sin\frac{x}{2}-\cos\frac{x}{2}}{2\sin\frac{x}{2}+\cos\frac{x}{2}}\right|+C$

(4) $-x+\frac{1}{4}\log_e\left|\frac{\sin\frac{x}{2}-\cos\frac{x}{2}}{\sin\frac{x}{2}+\cos\frac{x}{2}}\right|+C$

11. 4 marks

The value of $\frac{\int_0^1\left(1-x^3\right)^4dx}{\int_0^1\left(1-x^3\right)^3dx}$ is

(1) $\frac{20}{21}$

(2) $\frac{21}{20}$

(3) $\frac{12}{13}$

(4) $\frac{13}{12}$

12. 4 marks

The solution of the differential equation,

$\frac{dy}{dx}=\frac{\sqrt{1-y^2}}{y}$ which satisfies $y(0) = 1$, is

(1) $x-\sqrt{1-y^2}=0$

(2) $x+\sqrt{1-y^2}=0$

(3) $y-\sqrt{1-x^2}=0$

(4) $2x-\sqrt{1-y^2}=0$

13. 4 marks

If two vertices of a ΔABC are A(1, 1) and B(2, 3) and its area is 3 sq. units, then the locus of the third vertex of such triangles which lie above the line AB, is

(1) $2x-y+5=0$

(2) $2x+y-5=0$

(3) $2x-y-7=0$

(4) $2x-y+7=0$

14. 4 marks

The distance of the point (7, 1) from the focus of the parabola $x^2 - 8x + 16y = 0$ is

(1) 4

(2) 5

(3) 6

(4) 8

15. 4 marks

If the line $\alpha x + \beta y = 1$ touches the ellipse $a^2x^2 + b^2y^2 = 1$, then the locus of the point $\left(\frac{\alpha}{2},\frac{\beta}{2}\right)$ is

(1) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{2}$

(2) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{1}{4}$

(3) $\frac{x^2}{a^2}-\frac{y^2}{b^2}=\frac{1}{2}$

(4) $a^2x^2+b^2y^2=\frac{1}{4}$

16. 4 marks

The image of the point (–1, 0, 0) in the plane, $x - y + z + 3 = 0$ lies on the plane

(1) $3x-3y-3z+7=0$

(2) $3x-3y-3z+4=0$

(3) $6x-3y-3z+7=0$

(4) $6x+3y-3z+4=0$

17. 4 marks

Let $x_1, x_2, \ldots, x_n$ be n observations and let $w_i = lx_i + k$ $(i = 1, 2, \ldots, n)$, where k and l $(l > 0)$ are some constants. If the ordered pairs (mean, standard deviation) of x_i's and w_i's are (48, 12) and (55, 15) respectively, then $\frac{k}{l}$ equals

(1) -4
(2) -2
(3) $\frac{3}{2}$
(4) $\frac{4}{3}$

18. 4 marks

If x, y and z are the lengths of the perpendiculars drawn from circumcentre of a ΔABC to its sides BC, CA and AB respectively and $\frac{a}{x} = \alpha, \frac{b}{y} = \beta, \frac{c}{z} = \gamma$, where a, b and c are the lengths of the sides BC, CA and AB respectively ; then $\frac{3\alpha\beta\gamma}{\alpha+\beta+\gamma}$ is equal to

(1) 3
(2) 6
(3) 12
(4) 18

19. 4 marks

Let $f(x) = \sin\left[\cot^{-1}\left\{\cos\left(\tan^{-1} x\right)\right\}\right]$ be a function defined on the real line. Then the value of $f\left(\frac{\pi}{e}\right)$ is

(1) $\frac{\pi^2 - e^2}{\pi^2 + 2e^2}$
(2) $\sqrt{\frac{\pi^2 + e^2}{\pi^2 + 2e^2}}$
(3) $\sqrt{\frac{\pi^2 - e^2}{2\pi^2 - e^2}}$
(4) $\frac{\pi^2 e^2}{\pi^2 + 2e^2}$

20. 4 marks

The Boolean expression $(\sim p \vee q) \wedge (p \vee \sim q)$ is equivalent to

(1) $p \Rightarrow q$
(2) $q \Rightarrow p$
(3) $(p \Rightarrow q) \vee (q \Rightarrow p)$
(4) $(p \Rightarrow q) \wedge (q \Rightarrow p)$

Mathematics Section B

21. Numerical value · 4 marks

The total number of solutions $\{(x, y) : x, y \in \mathbb{R}\}$, for which the complex numbers $3 + ix^2y$ and $x^2 - y - 4i$ are conjugate of each other, is _____.

22. Numerical value · 4 marks

If $\begin{vmatrix} x-3 & 4x & 4x \\ 4x & x-3 & 4x \\ 4x & 4x & x-3 \end{vmatrix} = 3(Ax - B)(Ax + 3B)^2$, then $(A + B)(A - B)$ is equal to _____.

23. Numerical value · 4 marks

If A and B are respectively the coefficients of x^{14} and $\frac{1}{x^{16}}$ in the expansion of $\left(2x - \frac{1}{2x}\right)^{20}$ and $AB = k\,2^m$; where k is an odd integer, then m is equal to _____.

24. Numerical value · 4 marks

The sum of the remainders when $S = 3 + 6 + 12 + \ldots + 3 \cdot 2^{19}$ is divided by 3, 4, 5 and 6 is _____.

25. Numerical value · 4 marks

If for a real function f, $f(1) = 3$ and $f'(1) = 1$, then $\lim\limits_{x \to 1} \frac{3e^{(x-1)} - f(x)}{(x-1)}$ is equal to _____.

26. Numerical value · 4 marks

If the area of the region bounded by the curves, $y = 1 + \frac{1}{2}|2x - a|$, $x = -3$, $x = 3$, $y = 0$, where $a \in (-3, 3)$, is 16 square units, then a^2 is equal to _____.

27. Numerical value · 4 marks

If PA and PB are the tangents to the circle, $x^2+y^2=13$, drawn from a point $P\left(\frac{13}{5}, \frac{13}{5}\right)$ and A and B are the points of contact, then $(AB)^6$ is equal to _____.

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28. Numerical value · 4 marks

The distance of the point of intersection of the lines $\frac{x}{-1}=\frac{y-1}{-1}=\frac{z}{1}$ and $\frac{x}{1}=\frac{y}{2}=\frac{z-1}{-2}$ from the plane $2x-y+2z=7$ is _____.

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29. Numerical value · 4 marks

Let $\vec{a}=2\hat{i}-7\hat{j}-9\hat{k}$, $\vec{b}=3\hat{i}+8\hat{j}+10\hat{k}$, $\vec{c}=t\hat{i}+\hat{j}+\hat{k}$. If a vector $\vec{p}$ is perpendicular to both $\vec{a}$ and $\vec{b}$, $\vec{p}\cdot\vec{c}=20$, $\vec{p}\cdot\left(\hat{i}-\hat{j}-\hat{k}\right)=12$, then '$t$' is equal to _____.

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30. Numerical value · 4 marks

Let S = $\{a \in \mathbb{N} \mid$ there exists $\lambda, \mu \in \mathbb{Z}$ such that $\lambda a^2+\mu a+6\lambda=1\}$. If p is the probability that a randomly selected 2-digit number is an element of S, then $48p$ is equal to _____.

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31. 4 marks

Which temple complex is famous for its musical pillars ?

(1) Meenakshi Temple
(2) Brihadeshwara Temple
(3) Hampi
(4) Rameshwaram

32. 4 marks

Which of the following material is most suitable for parking areas ?

(1) Concrete
(2) Wood
(3) Marble
(4) Kota stone

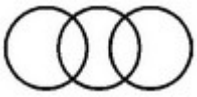
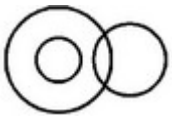
33. 4 marks

Who is known as 'Queen of Curves' in Architecture ?

(1) Jeanne Garg
(2) Jane Drew
(3) Jullia Morgan
(4) Zaha Hadid

34. 4 marks

Which of the following Venn diagram correctly illustrates the relationship among the class : Cement, Structure, Concrete ?

(1) 
(2) 
(3) 
(4) 

35. 4 marks

Rings in a tree trunk represents -

(1) Defects
(2) Age
(3) Strength
(4) Weakness

36. 4 marks

Saint Gobin in Indian Market is known for which of the following product ?

(1) Wooden doors
(2) Glass
(3) Modular kitchens
(4) Wire cut bricks

37. 4 marks

Indian parliament building was designed by which Architect ?

(1) Herbert Baker
(2) B. V. Doshi
(3) Raj Rewal
(4) Sanjay Puri

38. 4 marks

Which of the following material cannot be recycled ?

(1) Glass
(2) Terracota
(3) Steel
(4) Paper

39. 4 marks

What is the size of conventional brick ?

(1) 230 mm × 115 mm × 70 mm
(2) 230 mm × 110 mm × 75 mm
(3) 230 mm × 115 mm × 75 mm
(4) 230 mm × 110 mm × 65 mm

40. 4 marks

Which of the following site listed as the 1st UNESCO world heritage site in India ?

(1) Bhimbetta Caves
(2) Ajanta Caves
(3) Jaipur City
(4) Hampi

41. 4 marks

Which of the following scale represents the enlargement scale ?

(1) 1 : 2
(2) 1 : 20
(3) 50 : 1
(4) 1 : 1

42. 4 marks

The Meerabai temple is located at which of the following fort ?

(1) Jaigarh fort
(2) Chittor fort
(3) Nahargarh fort
(4) Jhansi fort

43. 4 marks

First Architecture college in Asia is located in which city ?

(1) Tokyo
(2) Mumbai
(3) Lahore
(4) Shanghai

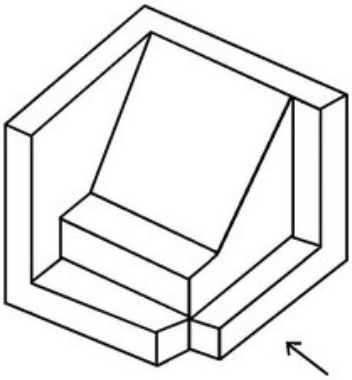
44. 4 marks

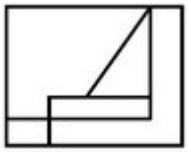
'Atal Tunnel' is located in which state of India ?

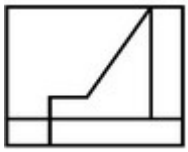
(1) Uttarakhand
(2) Jammu Kashmir
(3) Punjab
(4) Himachal Pradesh

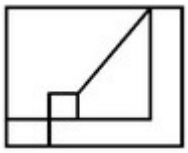
45. 4 marks

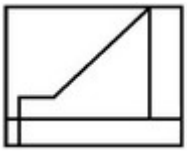
The 3D figure shows the view of an object. Identify the correct view looking in the direction of arrow from the answer figures.



(1) 

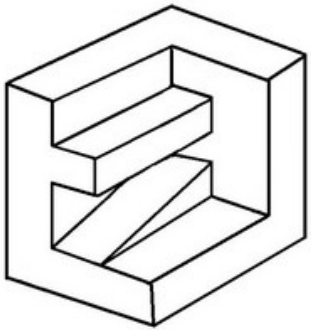
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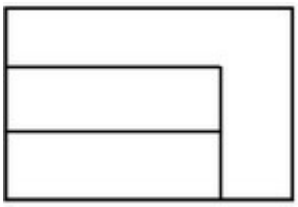
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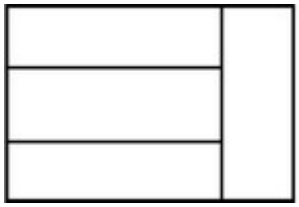
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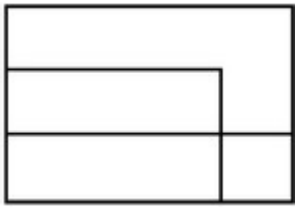
46. 4 marks

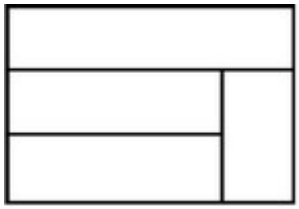
The 3D figure shows the view of an object. Identify the correct Top view from the answer figures.



(1) 

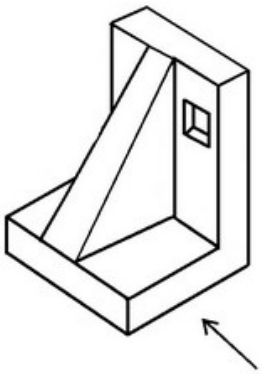
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(3) 

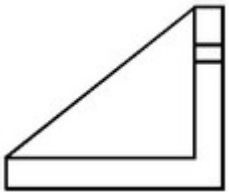
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47. 4 marks

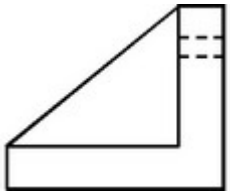
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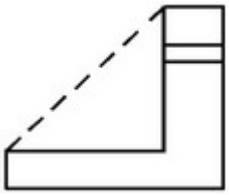
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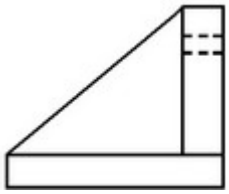
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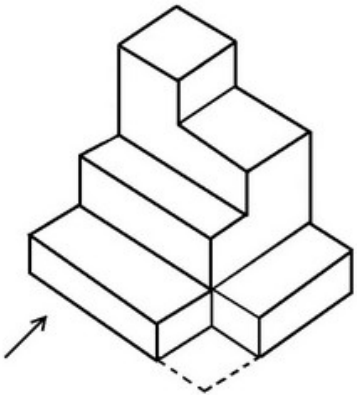


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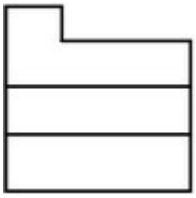


48. 4 marks

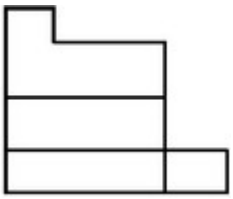
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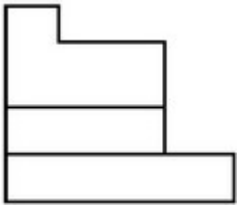
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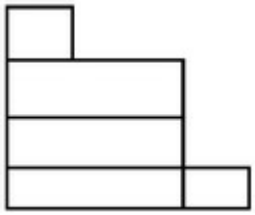
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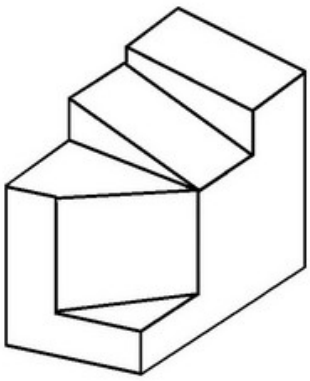


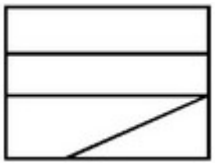
(4)

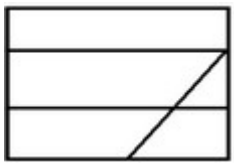


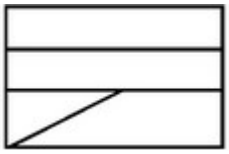
49. 4 marks

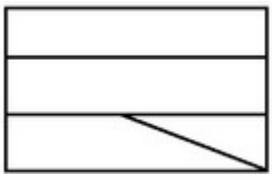
The 3D figure shows the view of an object. Identify the correct Top view from the answer figures.



(1) 

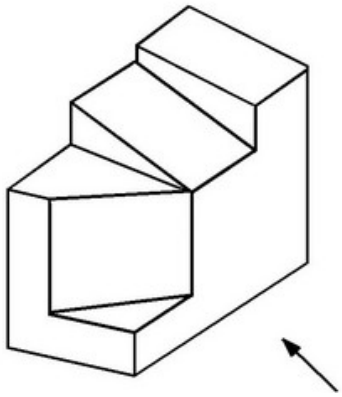
(2) 

(3) 

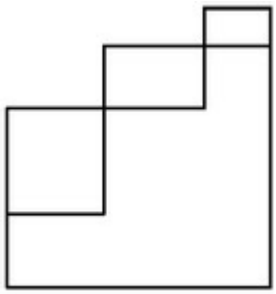
(4) 

50. 4 marks

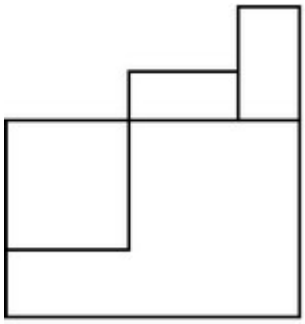
The 3D figure shows the view of an object. Identify the correct view looking in the direction of arrow from the answer figures.



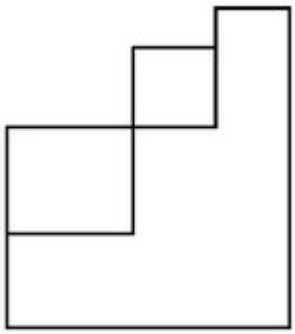
(1)



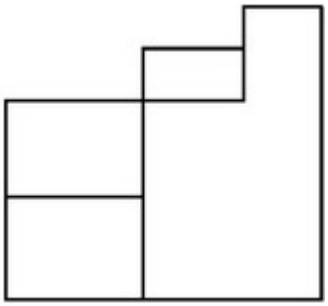
(2)



(3)

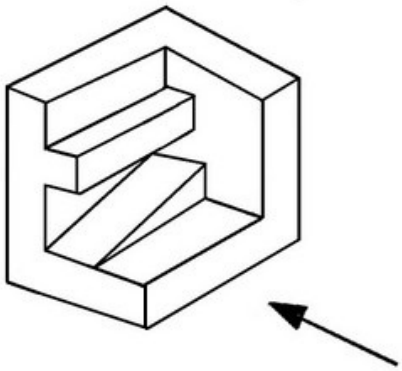


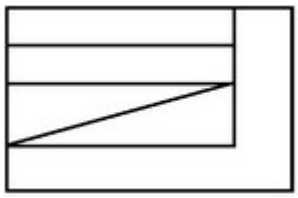
(4)

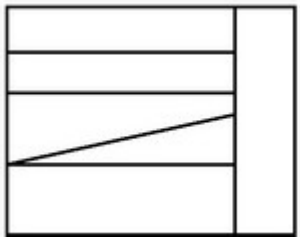


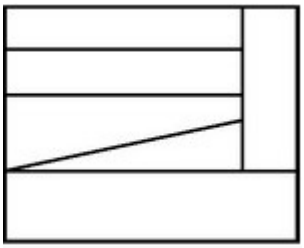
51. 4 marks

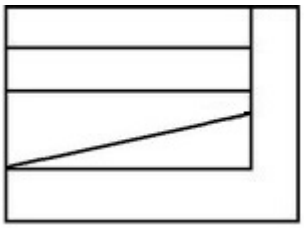
The 3D figure shows the view of an object. Identify the correct view looking in the direction of arrow from the answer figures.



(1) 

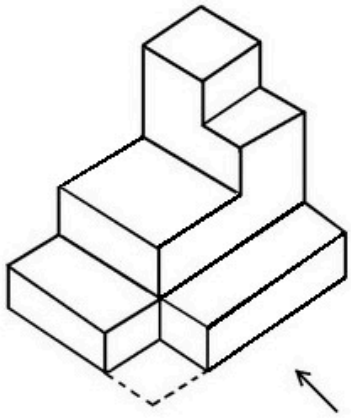
(2) 

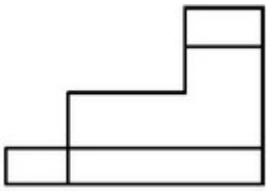
(3) 

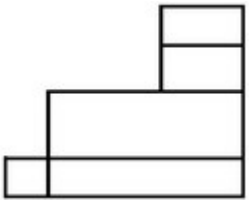
(4) 

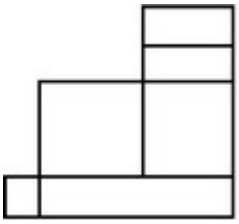
52. 4 marks

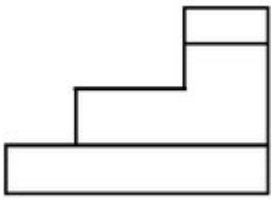
The 3D figure shows the view of an object. Identify the correct view looking in the direction of arrow from the answer figures.



(1) 

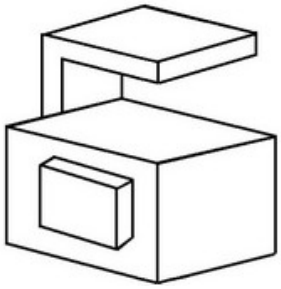
(2) 

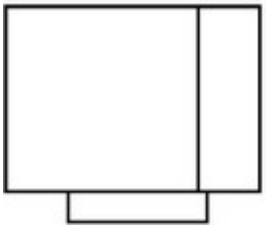
(3) 

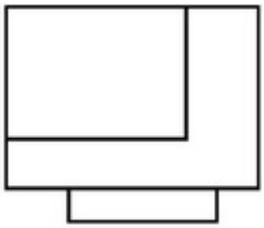
(4) 

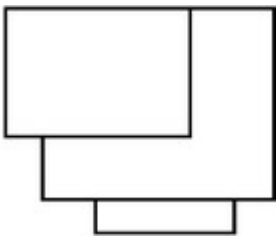
53. 4 marks

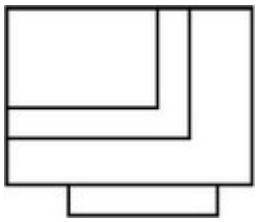
The 3D figure shows the view of an object. Identify the correct top view from the answer figures.



(1) 

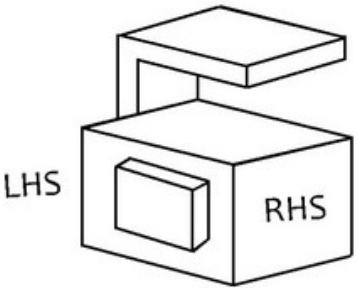
(2) 

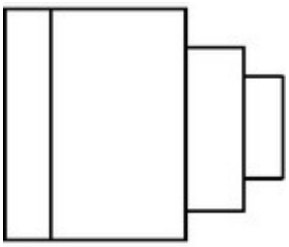
(3) 

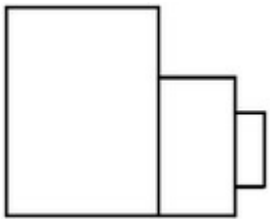
(4) 

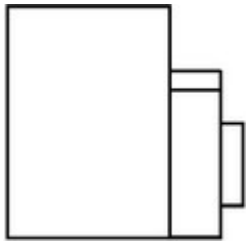
54. 4 marks

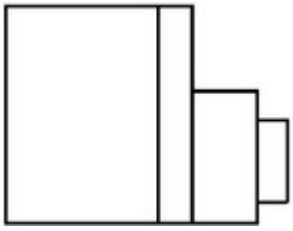
The 3D figure shows the view of an object. Identify the correct L.H.S. view, from the answer figures.



(1) 

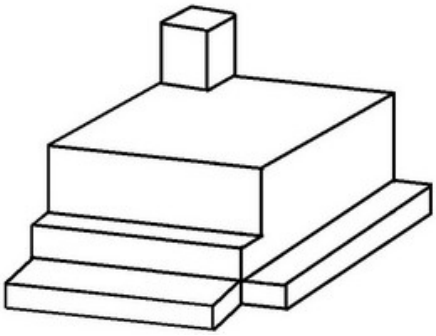
(2) 

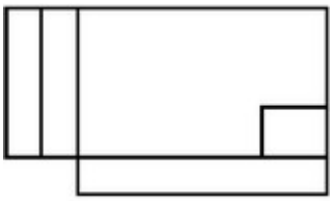
(3) 

(4) 

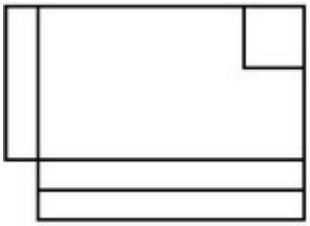
55. 4 marks

The 3D figure shows the view of an object. Identify the correct top view from the answer figures.



(1) 

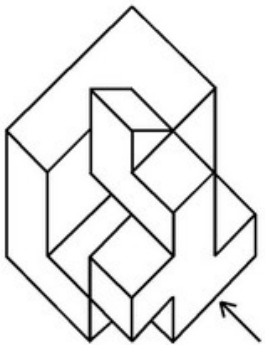
(2) 

(3) 

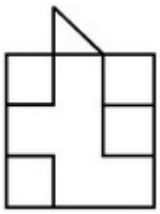
(4) 

56. 4 marks

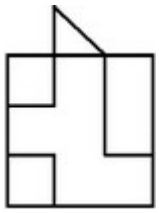
The 3D figure shows the view of an object. Identify the correct view looking in the direction of arrow from the answer figures.



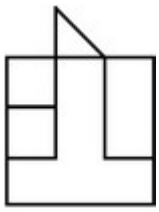
(1)



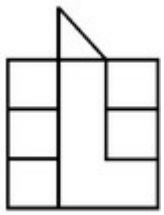
(2)



(3)

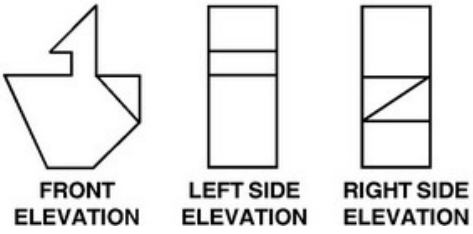


(4)



57. 4 marks

Three views (Front view, Left hand side view, Right hand side view) are given. Combine them and Identify the correct 3-Dimensional view from the answer figures.



(1)



(2)



(3)

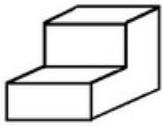


(4)

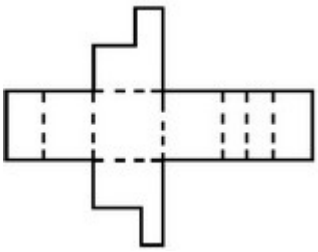


58. 4 marks

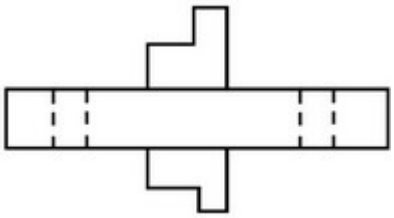
Which of the following answer figure shows the correct view of the 3-D image unfold ?



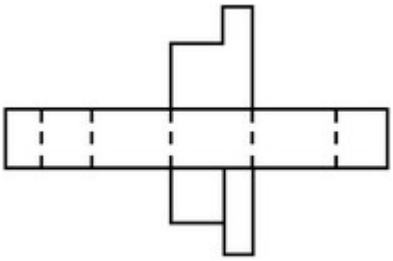
(1)



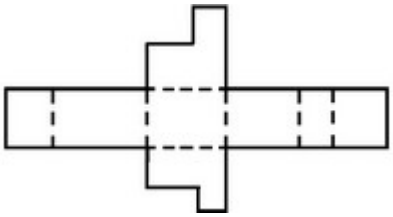
(2)



(3)

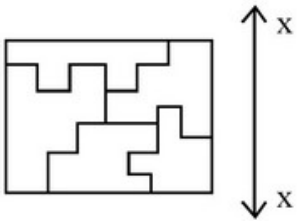


(4)

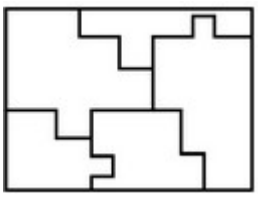


59. 4 marks

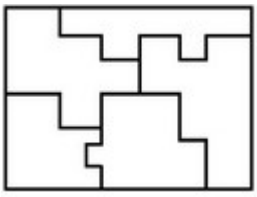
Which one of the answer figures is the correct mirror image of the problem figure with respect to x-x ?



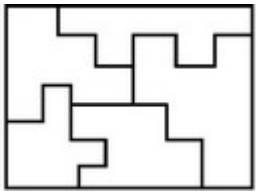
(1)



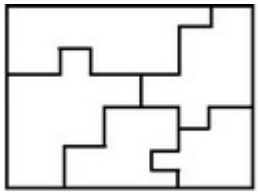
(2)



(3)

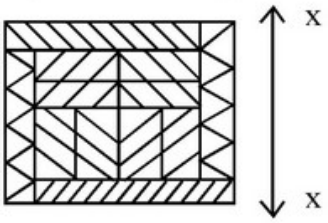


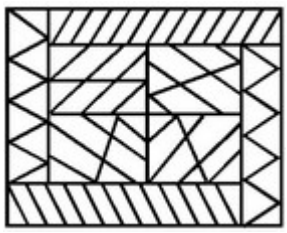
(4)

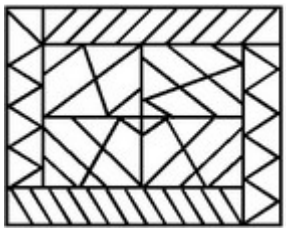


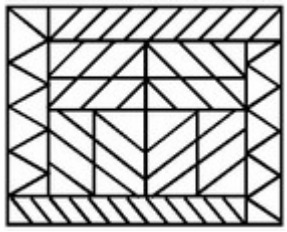
60. 4 marks

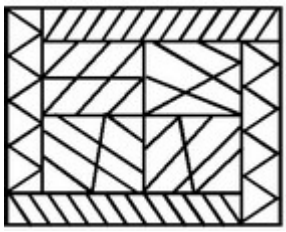
Which one of the answer figures is the correct Mirror image of the problem figure with respect to x-x ?



(1) 

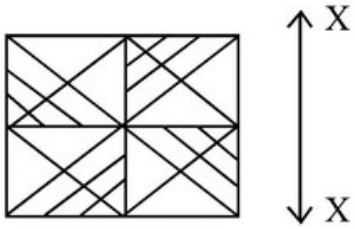
(2) 

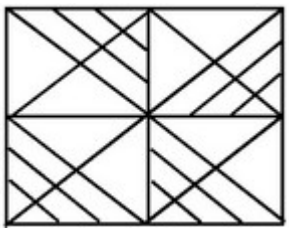
(3) 

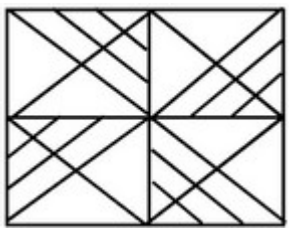
(4) 

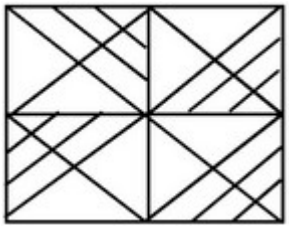
61. 4 marks

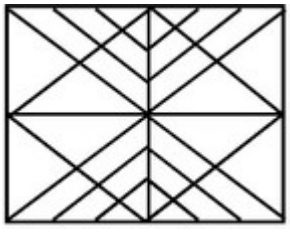
Which one of the answer figure is the correct Mirror image of the problem figure with respect to X-X ?



(1) 

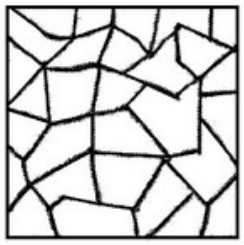
(2) 

(3) 

(4) 

62. 4 marks

One of the following answer figure is hidden in the problem figure in the same size and direction. Select the correct one.



(1) 

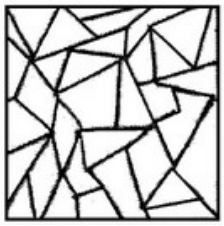
(2) 

(3) 

(4) 

63. 4 marks

One of the following answer figure is hidden in the problem figure in the same size and direction. Select the correct one.



(1) 

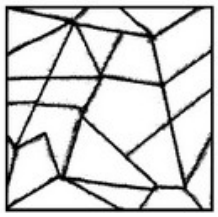
(2) 

(3) 

(4) 

64. 4 marks

One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.



(1) 

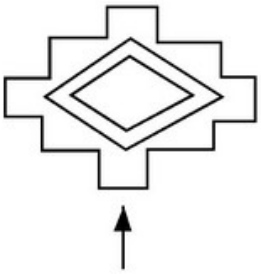
(2) 

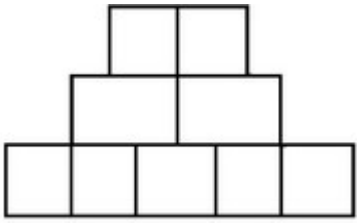
(3) 

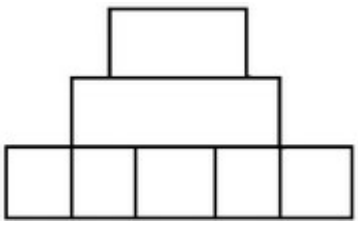
(4) 

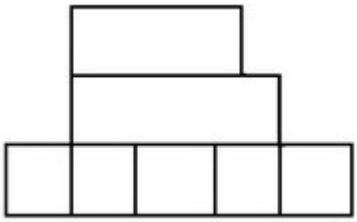
65. 4 marks

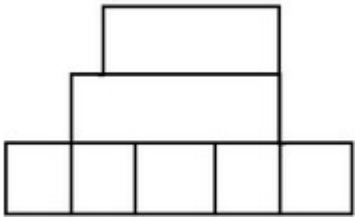
The problem figure shows the top view of an object. Identify the correct elevation from the figures looking in the direction of arrow.



(1) 

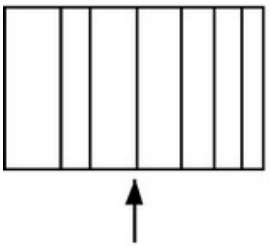
(2) 

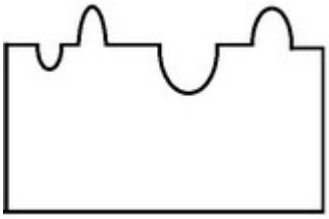
(3) 

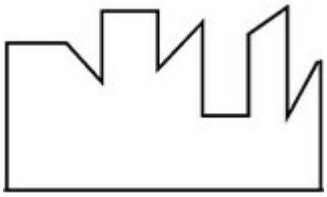
(4) 

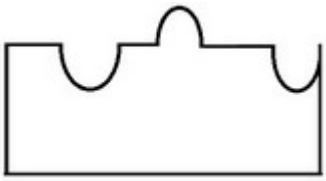
66. 4 marks

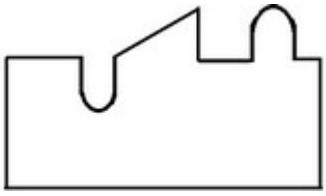
The problem figure shows the top view of an object. Identify the correct elevation from the answer figures looking in the direction of arrow.



(1) 

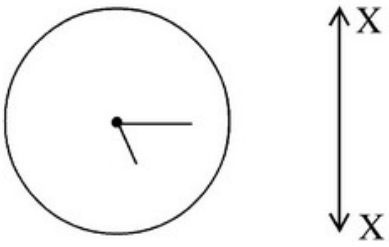
(2) 

(3) 

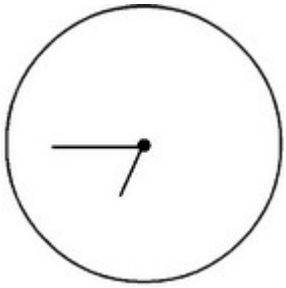
(4) 

67. 4 marks

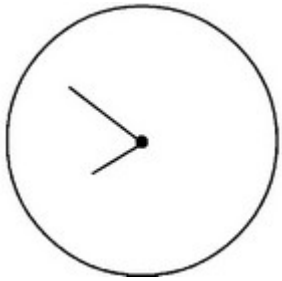
Which one of the answer figure is the correct Mirror image of the problem figure with respect to X-X ?



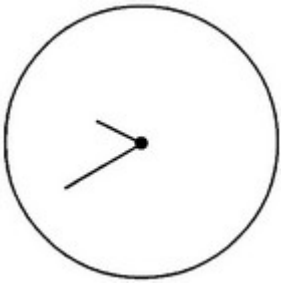
(1)



(2)



(3)



(4)



68. 4 marks

'Shikara' is a type of boat found mainly in lakes of city of the following states.

(1) Udaipur
(2) Jammu-Kashmir
(3) Kerala
(4) Manipur

69. 4 marks

Who amongst the following designed the 'Ram Mandir' at Ayodhya ?

(1) Chandrakant Sompura
(2) Hafeez Contractor
(3) Anant Raje
(4) Raza Kabul

70. 4 marks

Which of the following group represent Primary colours ?

(1) White, Black, Grey
(2) Violet, Green, Orange
(3) Red, Blue, Yellow
(4) Red, Green, Black

71. 4 marks

'Kedarnath' is located in which district of India ?

(1) Uttarkashi
(2) Uttarakhand
(3) Chamoli
(4) Rudraprayag

72. 4 marks

Who is the Architect of 'Virasat-e-Khalsa' ?

(1) I. M. Pei
(2) Moshie Safdie
(3) Raj Rewal
(4) Bimal Patel

73. 4 marks

Who was the Architect of famous 'Glass Pyramid at the Louvre Paris' ?

(1) Walter Groupius
(2) Charles Correa
(3) I. M. Pei
(4) F. L. Wright

74. 4 marks

Match the following List-I with List-II.

	List-I		**List-II**
A.	Madhubani painting	I.	Madhya Pradesh
B.	Shekhwati painting	II.	Orissa
C.	Pattuchitra painting	III.	Bihar
D.	Gond painting	IV.	Rajasthan

(1) A-I, B-II, C-IV, D-III
(2) A-III, B-IV, C-II, D-I
(3) A-II, B-III, C-IV, D-I
(4) A-IV, B-I, C-II, D-III

75. 4 marks

What do you understand by 'Complementary colours' ? Choose correct answer amongst the following

(1) Mixing the primary colours.
(2) Colours next to each other on colour wheel.
(3) Colours opposite to each other on colour wheel.
(4) Mixing of secondary colours.

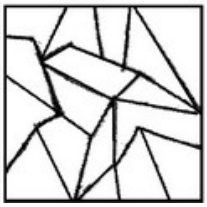
76. 4 marks

Who worked with 'Le-corbusier' on Chandigarh planning among following architects.

(1) C. P. Kukreja
(2) F. L. Wright
(3) Stein Joseph
(4) Raj Rewal

77. 4 marks

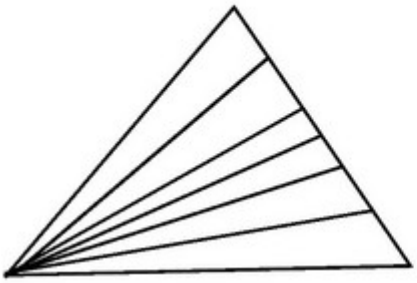
One of the following answer figure is hidden in the problem figure in same size and direction. Select the correct one.



(1) 
(2) 
(3) 
(4) 

78. 4 marks

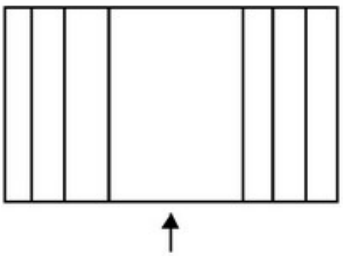
In the following question number of triangles are ?

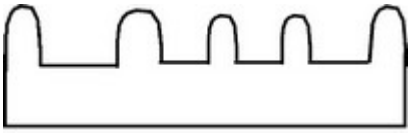


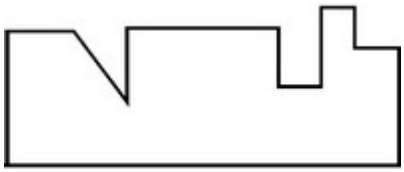
(1) 15
(2) 19
(3) 20
(4) 21

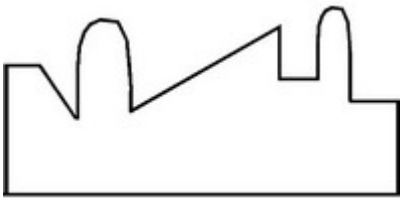
79. 4 marks

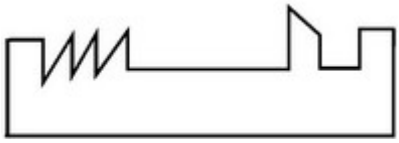
The problem figure shows the top view of an object. Identify the correct elevation from the answer figures looking in the direction of arrow.



(1) 

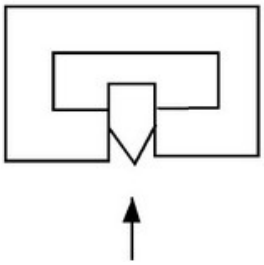
(2) 

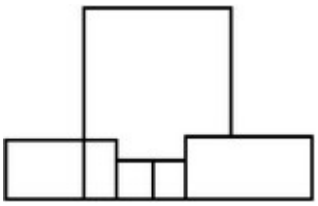
(3) 

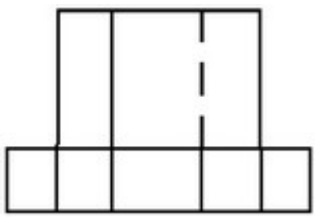
(4) 

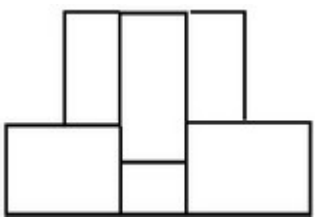
80. 4 marks

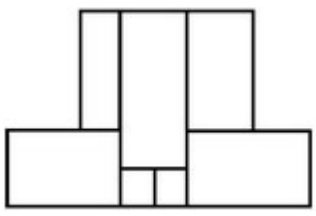
The problem figure shows the top view of an object. Identify the correct elevation from the answer figure. Looking in the direction of arrow.



(1) 

(2) 

(3) 

(4) 

Planning

81. 4 marks

Which country has the highest life expectancy in the world in 2020 ?

(1) Honk Kong
(2) Switzerland
(3) India
(4) Australia

82. 4 marks

(a) Metropolis
(b) Neighbourhood
(c) Polis
(d) Anthropos

Which of the following is the **correct** option based on the descending population size ?

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

83. 4 marks

In which year the Indian Forest Act was passed ?

(1) 1921
(2) 1927
(3) 1930
(4) 1951

84. 4 marks

Which one of the following is NOT a dominant characteristics of Islamic cities during medieval period ?

(1) Gardens
(2) Candles
(3) Mosque
(4) Cathedral

85. 4 marks

Which of these is a capital city ?

(1) Frankfurt
(2) Sydney
(3) New York
(4) Stockholm

86. 4 marks

The headquarters of World Health Organisation is located in :

(1) Washington D.C.
(2) Paris
(3) Stockholm
(4) Geneva

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87. 4 marks

Match **List - I** with **List - II** :

	List - I		**List - II**
A	Auroville	I	Dilwara Temples
B	New Delhi	II	Dakshineshwar Temple
C	Mount Abu	III	Bahai Temple
D	Kolkata	IV	Matrimandir

Choose the **correct** answer from the options given below :

(1) A-II, B-III, C-IV, D-I
(2) A-III, B-II, C-IV, D-I
(3) A-IV, B-II, C-I, D-III
(4) A-IV, B-III, C-I, D-II

88. 4 marks

Which of the following was the main aim to promote 'World Trade Organisation' ?

(1) To liberalise international trade.
(2) To promote trade of rich countries.
(3) To promote trade of poor countries.
(4) To promote bilateral trade.

89. 4 marks

Gender division usually refers to :

(1) Unequal child sex ratio.
(2) Absence of voting rights for women.
(3) Biological difference between men and women.
(4) Unequal roles assigned by the society to men and women.

90. 4 marks

The ways in which individuals may become cut-off from full involvement in the society is known as :

(1) Social inclusion
(2) Social inequality
(3) Social stratification
(4) Social exclusion

91. 4 marks

The per capita income of a country is calculated by dividing :

(1) The total income by total consumption.

(2) The national income by its total population.

(3) The total value of goods and services amongst its citizens.

(4) The national income by total capital investments.

---

92. 4 marks

Which of the following problems is associated with burning of coal ?

(1) generation of ash with toxic impurities.

(2) spillage of coal-tar on land and land-degradation.

(3) carbon dioxide emissions.

(4) acid rain phenomenon.

---

93. 4 marks

If the distance between points A and B on the map measures 2.5 cm and the scale given on the map is 1 : 500, what will be the distance between points A and B on actual ground ?

(1) 12.5 cm (2) 20 cm

(3) 12.5 m (4) 20 m

---

94. 4 marks

The maximum potential of wind energy is available in which of the following states of India ?

(1) Karnataka (2) Andhra Pradesh

(3) Gujarat (4) Tamil Nadu

---

95. 4 marks

What is the full form of GIS ? Choose the correct answer.

(1) Geological Information System

(2) Geographic Information System

(3) Geo-scientific Intelligent System

(4) Geo-photographic Intelligent Satellite

---

96. 4 marks

Match **List - I** with **List - II** :

	List - I		**List - II**
A	Satyagraha Movement	I	Alaknanda valley
B	Chipko Movement	II	Calcutta
C	Swadeshi Movement	III	Bambay
D	Quit India Movement	IV	Champaran

Choose the **correct** answer from the options given below :

(1) A - I, B - IV, C - II, D - III

(2) A - II, B - III, C - IV, D - I

(3) A - III, B - IV, C - II, D - I

(4) A - IV, B - I, C - II, D - III

---

97. 4 marks

The concentration of NO_2 (in ppm) collected from 30 wards of a city is shown below :

Concentration of NO_2	**Frequency**
0.00 - 0.04	4
0.04 - 0.08	9
0.08 - 0.12	9
0.12 - 0.16	2
0.16 - 0.20	4
0.20 - 0.24	2

Find the mean concentration of NO_2 in the air. Choose the **correct** answer.

(1) 0.99 ppm

(2) 0.009 ppm

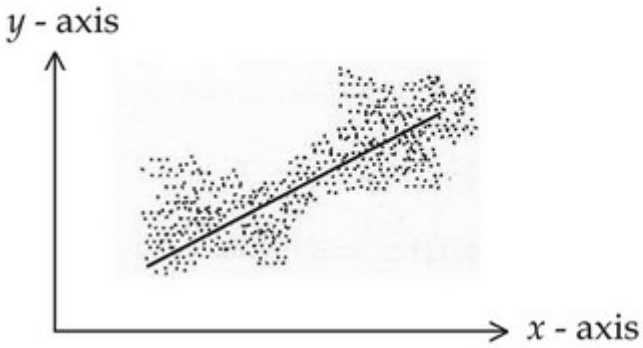
(3) 0.099 ppm

(4) 9.0 ppm

---

98. 4 marks

Given scatter diagram can be interpreted as showing :



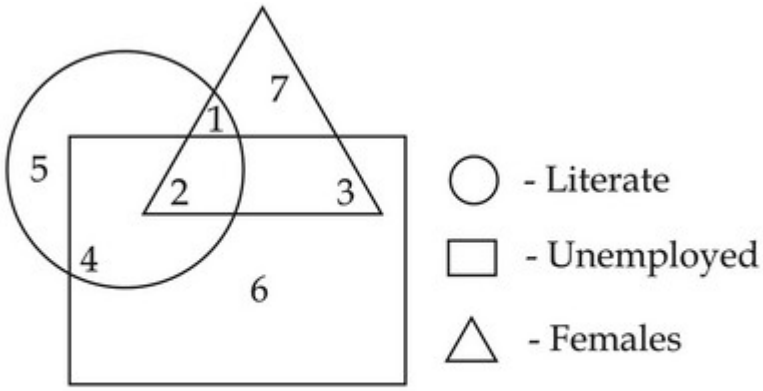
(1) Low degree of positive correlation

(2) High degree of positive correlation

(3) Perfect positive correlation

(4) No correlation

99. 4 marks



Which number represents unemployed and illiterate females ?

(1) 2

(2) 1

(3) 4

(4) 3

100. 4 marks

Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Women home-based workers suffer from various ailments in a city.

Reason (R) : Metropolitan cities show a high growth of population from census 2001 to census 2011.

In the light of the above statements, choose the **correct** answer from the options given below :

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true but **(R)** is **NOT** the correct explanation of **(A)**.

(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

---

101. 4 marks

Given below are two statements : One is labelled as **Assertion (A)** and the other is labelled as **Reason (R)**.

Assertion (A) : Global temperature is expected to rise significantly.

Reason (R) : Increasing vehicular growth is causing increasing carbon dioxide emission in air.

In the light of the above statements, choose the *most appropriate* answer from the options given below :

(1) Both **(A)** and **(R)** are true and **(R)** is the correct explanation of **(A)**.

(2) Both **(A)** and **(R)** are true but **(R)** is **NOT** the correct explanation of **(A)**.

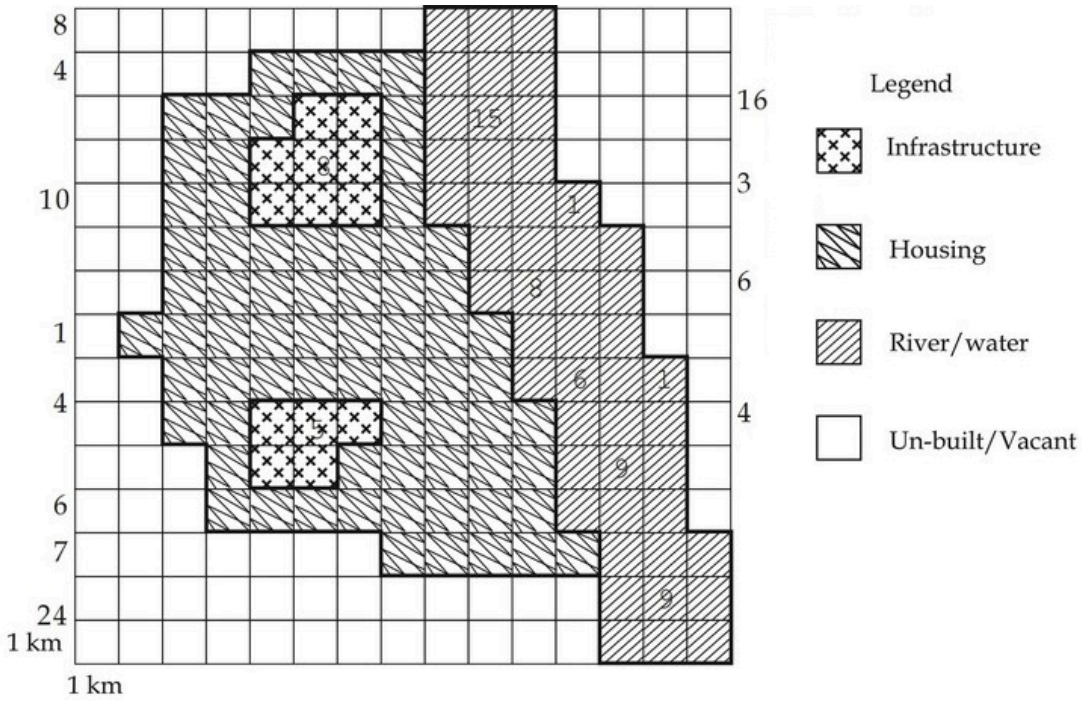
(3) **(A)** is true but **(R)** is false.

(4) **(A)** is false but **(R)** is true.

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102. 4 marks



The above layout shows built area as well as Un-built area. Housing area has four floors and infrastructure has seven floors. Find the ratio of land under built area to Non-built area. The correct answer is :

(1) 142 : 92
(2) 83 : 142
(3) 83 : 92
(4) 142 : 83

103. 4 marks

The ratio of built housing area on all floors to built infrastructure area on all floors will be :

(1) 280 : 91
(2) 281 : 90
(3) 90 : 281
(4) 91 : 280

104. 4 marks

In many Dutch and German cities, residential streets are now places where cars must give ways to pedestrians. In these traffic calmed areas, residents and visitors accept the view that the function of streets is not merely to provide mobility for cars. Streets may also be used for walking, cycling, playing and other social interactions. One of the most important aspects of these streets in the range of "traffic calming" initiatives, aimed at reducing the volume and speed of traffic. These initiatives lead to several positive effects on children's social interaction. Recent research has demonstrated that children in German cities have significantly higher level of freedom to travel to places unoccupied by adults in their own neighbourhood than children in other-cities of the world.

One of the main purposes of "traffic calming", as understood from the above passage is to :

(1) calm the children playing on the street.

(2) reduce the speeds of vehicles on the street.

(3) reduce the noise created by traffic on the street.

(4) calm the residents of the neighbourhoods to curb their aggressive nature.

105. 4 marks

In many Dutch and German cities, residential streets are now places where cars must give ways to pedestrians. In these traffic calmed areas, residents and visitors accept the view that the function of streets is not merely to provide mobility for cars. Streets may also be used for walking, cycling, playing and other social interactions. One of the most important aspects of these streets in the range of "traffic calming" initiatives, aimed at reducing the volume and speed of traffic. These initiatives lead to several positive effects on children's social interaction. Recent research has demonstrated that children in German cities have significantly higher level of freedom to travel to places unoccupied by adults in their own neighbourhood than children in other-cities of the world.

As per the above passage, the "traffic calming" initiatives have impacted the children in these neighbourhoods in terms of :

(1) enhancing their cognitive skills.

(2) making them independent from parental control.

(3) calming them.

(4) increasing their mobility and social interactions.