Joint Entrance Examination (Main) - JEE(Main)

Paper Name B. Arch (Paper 2A)

Test Date 23-06-2022 Slot SLOT - 2 Lang English

Q:1

Topic Name: Mathematics – Part I-Section A

ItemCode: 121

The equation of the plane passing through the intersection of the planes

$$\overrightarrow{r} \cdot (\widehat{i} + 2\widehat{j} - \widehat{k}) = 3$$
 and $\overrightarrow{r} \cdot (2\widehat{i} - \widehat{j} + 3\widehat{k}) = 2$, and parallel to the line

Question:
$$\frac{x-1}{1} = \frac{y-2}{2} = \frac{z-3}{1}$$
, is

$$\mathbf{A} \xrightarrow[r]{} \left(\overset{\wedge}{-5i} + 10 \hat{j} - 15 \hat{k} \right) = 4$$

$$\mathbf{B} \stackrel{\rightarrow}{r} \cdot \left(-5 \, \hat{i} + 10 \, \hat{j} - 15 \, \hat{k} \right) = 1$$

$$\mathbf{C} \stackrel{\rightarrow}{r} \cdot \left(-9 \, \hat{i} + 6 \, \hat{j} - 3 \, \hat{k} \right) = 4$$

$$\mathbf{D} \stackrel{\rightarrow}{r} \cdot \left(-9 \, \hat{i} + 6 \, \hat{j} - 3 \, \hat{k} \right) = 1$$

Q:2

Topic Name: Mathematics - Part I-Section A

ItemCode:122

Let $f, g : \mathbb{R} \to \mathbb{R}$ be functions defined by f(x) = x - 7 and $g(x) = [7 + \sin x]$, where

[t] is the greatest integer less than or equal to t. Then the number of points in $[0, \pi]$,

Question: where the function fog + gof is not continuous, is

A 1

B 2

C 3

D 5

Q:3

Topic Name: Mathematics – Part I-Section A

ItemCode: 123

Let m and n be non-negative or egers such that for

$$x \in \left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$$
, $\tan x + \sin x = m$, $\tan x - \sin x = n$. Then the possible ordered pair

Question: (m, n) is

A (2, 1) but not (3, 4)

B (3, 4) but not (2, 1)

C both (2, 1) and (3, 4)

D neither (2, 1) nor (3, 4)

Q:4

Topic Name: Mathematics – Part I-Section A

ItemCode:124

Question: Let $f(x) = (x + 4)^2 - 4$, $x \ge -4$. Then $\{x : f(x) = f^{-1}(x)\}$ is equal to

 $\mathbf{A} \ \{-4, -3, 3, 4\}$

B {-3, 0, 4}

C {-4, 3}

D $\{-4, -3\}$

Q:5

Topic Name: Mathematics - Part I-Section A ItemCode: 125 Let z be a complex number and $\theta = \tan^{-1} \left(\frac{|\operatorname{Im}(z)|}{|\operatorname{Re}(z)|} \right)$ be an acute angle. If $\arg(z) = \theta - \pi$, $|\operatorname{Re}(z)| = |\operatorname{Re}(1 - 2i)^{-3}|$ and $|\operatorname{Im}(z)| = |\operatorname{Im}(1 - 2i)^{-3}|$, then $125 \operatorname{Im} \left(z + \frac{2i}{\overline{z}} \right)$ is equal to **Question:** A -2752 B - 1377C -1152 D -627 **O**:6 **Topic Name:** Mathematics – Part I-Section A ItemCode: 126 Let $A = [a_{ij}]$, $\det(A) \neq 0$, and $B = [b_{ij}]$ be two 3×3 matrices. If $b_{ij} = 3^{i-j} a_{ij}$ for all Question: i, j = 1, 2, 3 then A $3 \det(A) = \det(B)$ $\mathbf{B} \quad 27 \, \det(A) = \det(B)$ \mathbf{C} $\det(A) = \det(B)$ $\mathbf{D} \quad \det(A) = 27 \det(B)$ Topic Name: Mathematics - Part I-Section A ItemCode:127 Let A be a 3×3 symmetric matrix with integer entries. If the sum of all the downloaded from Question: diagonal elements of A^2 is 2, then the total number of such matrices A is equal to A 12 B 6 C 18

D 24

Q:8 Topic Name: Mathematics - Part I-Section A

ItemCode:128

If $(20_{C_1})^2 + 2(20_{C_2})^2 + 3(20_{C_3})^2 + ... + 20(20_{C_{20}})^2 = K$, then $\frac{(20!)^2 K}{40!}$ is equal to

Question:

 $\frac{1}{10}$

 \mathbf{C} D 10

Q:9 Topic Name: Mathematics - Part I-Section A

ItemCode: 129 Let y = y(x) be the solution of the differential equation $xdy + ydx = xy^2dx$, which

Question: passes through (1, 1). Then $y(e^{\pi})$ is equal to

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$$\begin{array}{c}
\mathbf{B} & \frac{e^{-\pi}}{1-\pi} \\
\mathbf{C} & \frac{e^{\pi}}{1+\pi}
\end{array}$$

$$\mathbf{D} \quad \underline{e^{\pi}}_{1-\pi}$$

Q:10

Topic Name: Mathematics – Part I-Section A

ItemCode:1210

Let $f: [-2a, 2a] \to \mathbb{R}$ be a thrice differentiable function and g be defined as g(x) = f(a+x) + f(a-x). If m is the minimum number of roots of g'(x) = 0 in the interval (-a, a) and n is the minimum number of roots of g'''(x) = 0 in the interval

Question: (-a, a), then m + n is equal to

Question

A 1

B 2

C 4

D 5

Q:11
Topic Name: Mathematics – Part I-Section A

ItemCode:1211

Let y = y(x) be the solution of the initial value problem $2x \frac{dy}{dx} = 3xe^{\frac{y}{x}} + 2y$,

Question: $y(1) = \log_e 3$. Then $y(\frac{1}{e})$ is equal to

$$\frac{\mathbf{A}}{-\frac{1}{e}\log_e\left(\frac{11}{6}\right)}$$

$$\frac{1}{e}\log_e\left(\frac{11}{6}\right)$$

$$-\frac{2}{e}\log_e\left(\frac{11}{6}\right)$$

$$\mathbf{D} \quad \frac{3}{e} \log_e \left(\frac{11}{6} \right)$$

Q:12

Topic Name: Mathematics – Part I-Section A

ItemCode:1212

Let $f(t) = \int_0^t e^{x^2} \left((1 + 2x^2) \sin x + x \cos x \right) dx$. Then the value of $f(\pi) - f\left(\frac{\pi}{2}\right)$ is

Question: equal to

A
$$-\pi e^{\pi^2/4}$$

$$\frac{\mathbf{B}}{-\frac{\pi}{2}}e^{\pi^2/4}$$

C
$$\frac{\pi}{2}e^{\pi^2/4}$$

$$\mathbf{D} \Big|_{\pi e^{\pi^2/4}}$$

Q:13

Topic Name: Mathematics - Part I-Section A

ItemCode:1213

Let $f: [-2, 2] \to \mathbb{R}$ be defined by $f(x) = x\sqrt{4-x^2}$. Then which one of the

Question: following is NOT true?

A	f has two critical points in $(-2, 2)$
В	Minimum value of f is -2 .
C	x = -2 is a local minima.
D	f is increasing in $\left(-\sqrt{2},\sqrt{2}\right)$
Q: 1	
_	ic Name: Mathematics – Part I-Section A
	mCode:1214 If the lines $x + 2y = 1$ and $x - 3y = 1$ are tangents to a circle, then its centre will lie
	estion: 01
	2x - y = 1
	2x - y = 2
	$x^2 - y^2 - 14y - 2x + 14xy + 1 = 0$
D	$x^2 + y^2 + 14y - 2x - 14xy + 1 = 0$
Q :1	5
Тор	ic Name: Mathematics – Part I-Section A
Ite	mCode:1215 $x-3$ $y+2$ $z-1$
	The mirror image of the line $\frac{x-3}{-1} = \frac{y+2}{1} = \frac{z-1}{1}$ with respect to the plane
	estion: 3x - y + 4z = 2 is
A	$\frac{x}{-1} = \frac{y+1}{1} = \frac{z+3}{1}$
В	$\frac{x}{1} = \frac{y+1}{1} = \frac{z+3}{1}$
C	$\frac{x+1}{-1} = \frac{y}{-1} = \frac{z+2}{1}$
D	$\frac{x+1}{-1} = \frac{y}{-1} = \frac{z+2}{-1}$
Q:1 Ton	6 ic Name: Mathematics – Part I-Section A
_	mCode:1216
	Let \hat{a} and \hat{c} be collinear unit vectors such that $(\vec{b} - 4\hat{c}) = -9\hat{a}$ for a vector \vec{b} .
Qι	estion: Then $ \overrightarrow{b} ^2$ is equal to:
A	27
В	25
C	21
D	18
Q: 1	
	ic Name: Mathematics – Part I-Section A mCode: 1217
	The probability that two randomly selected distinct 2-digit natural numbers have a sestion: common factor either 2 or 3 is:
A	<u>88</u> <u>267</u>
В	95 267
C	$\frac{1}{3}$
D	
D	608 1617
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Topic Name: Mathematics - Part I-Section A

ItemCode:1218

The value of $\int_{-1}^{2} |x^3 \sin \pi x| dx$ is equal to

Question:

A	11	4	6
	π	π^2	π^3

$$\mathbf{B} \quad \frac{11}{\pi} - \frac{30}{\pi^3}$$

C
$$\frac{11}{\pi} + \frac{4}{\pi^2} - \frac{6}{\pi^3}$$

$$\frac{11}{\pi} + \frac{30}{\pi^3}$$

Topic Name: Mathematics - Part I-Section A

ItemCode: 1219

Question: The converse of the logical statement $(p \land (\sim q)) \Rightarrow (p \lor q)$ is equivalent to

 $\mathbf{B} q$

C ~ P

Topic Name: Mathematics - Part I-Section A

ItemCode: 1220

Consider ellipse $E: \frac{x^2}{9} + \frac{y^2}{4} = 1$ and hyperbola $H: \frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$, with eccentricities

downlanded from e_1 and e_2 , respectively. If the hyperbola H passes through the focus of the ellipse

Question: E and $e_1: e_2 = 1:3$, then the length of latus rectum of the hyperbola H is equal to

A $2\sqrt{5}$

B $4\sqrt{5}$

C 8√5

D $10\sqrt{5}$

Q:21

Topic Name: Mathematics – Part I-Section B

Let $\sqrt{3}x + y = \frac{5\sqrt{3}}{2}$ and $\sqrt{5}x + y = \frac{7\sqrt{5}}{2}$ be two normal lines to the

parabola $y^2 = 2x$ at points P and Q. If the tangent lines at P and Q intersect at the

Ouestion: point (a, b), then the value of $b^2 - a$ is equal to _____.

Topic Name: Mathematics - Part I-Section B

If the normal to the curve $(y - x^5)^2 = x(1 + x^2)^2$ at the point (1, 3) passes through

Ouestion: the point $(\alpha, 2)$, then $|\alpha|$ is equal to _____.

Topic Name: Mathematics - Part I-Section B

ItemCode: 1223

If the system of linear equations $2x - 3y + 5z = \beta$ $\alpha x + y + 2z = 3$ 3x - 16y + 23z = -13Ouestion: has infinitely many solutions, then $\alpha + \beta$ is equal to ______

Topic Name: Mathematics - Part I-Section B

ItemCode: 1224

Let $f: \mathbb{N} \to \mathbb{N}$ be a function defined by

$$f(n) = an^2 + bn + c$$
. If $f(1) = 3$, $f(2) = 6$ and $f(n) = \frac{f(n-1) + f(n-2) + 8n^2 - 3}{6}$

Question: for every $n \ge 3$, then f(100) is equal to _____.

O:25

Topic Name: Mathematics - Part I-Section B

ItemCode:1225

If the coefficient of x^8 in the expansion of $(1-x^2)^3 (1+2x^3)^7 (1+x^4)^5$ is β ,

Ouestion: then |\beta| is equal to _____.

Q:26

Topic Name: Mathematics - Part I-Section B

ItemCode: 1226

If for real numbers α and β , $\int \frac{1+x\cos x}{x(1-x^2e^{2\sin x})} dx = \alpha \log_e \left| \frac{1}{x^2e^{2\sin x}} - \beta \right| + \text{constant}$,

Question: then the value of $10(\alpha + \beta)$ is equal to _____

Q:27

Topic Name: Mathematics - Part I-Section B

ItemCode:1227

If the mean and variance of the observations 2, 6, α , 10, 12, β , 15 are 9 and 18

Question: respectively, then αβ equals _____

Q:28

Topic Name: Mathematics – Part I-Section B

ItemCode:1228

The number of real solution of the equation $e^{4x} + 4e^{3x} - e^{2x} - 10e^x + 6 = 0$ is

Question: equal to _____.

Q:29

Topic Name: Mathematics - Part I-Section B

ItemCode: 122

Let A_1, A_2, A_3 be an increasing G.P. of positive real numbers. If

Ouestion: $A_6 = 49A_2$ and $A_6 + A_3A_5 = 8$, then $A_7 (A_1 + A_3)$ is equal to _____.

Q:30

Topic Name: Mathematics - Part I-Section B

ItemCode:1230

Suppose that \overrightarrow{a} , \overrightarrow{b} and \overrightarrow{c} are non-coplanar vectors in \mathbb{R}^3 . Let the components of a

vector $\stackrel{\rightarrow}{n}$ along $\stackrel{\rightarrow}{a}$, $\stackrel{\rightarrow}{b}$ and $\stackrel{\rightarrow}{c}$ be 2, 5 and 3 respectively. If the components of this

vector \overrightarrow{n} along $\overrightarrow{a} + 2\overrightarrow{b} - \overrightarrow{c}$, $-2\overrightarrow{a} + \overrightarrow{b} + \overrightarrow{c}$ and $\overrightarrow{a} - \overrightarrow{b} - 2\overrightarrow{c}$ are x, y and

Question: z respectively, then the value of x + y - 4z is equal to _____

Q:31

Topic Name: Aptitude Test - Part II Download all NOTES and PAPERS at StudentSuvidha.com

ItemCode:41231 'Amar Jawan Jyoti' which was conceptualised & constructed after Indo-Pakistan Question: war of 1971, is now merged with flame of... A New Parliament Building National War Memorial C Wagah Border, Punjab D Rastrapati Bhawan O:32 Topic Name: Aptitude Test - Part II ItemCode:41232 Which amongst the following author has wrote the famous book "The Death and Question: Life of Great American Cities". Charles Comea Richard Meier Laurie Baker Jane Jacob Q:33 Topic Name: Aptitude Test - Part II ItemCode:41233 "The Hall of Nations" in Pragati Maidan at New Delhi was designed essentially a three dimensional space with unit ofdownloaded **Ouestion**: A A spheroid A Decahedron An Octahedron A Tetrahedron O:34 Topic Name: Aptitude Test – Part II ItemCode:41234 Question: Write the full form of 'CPCB'. A Center Polluted Control Board Central Pollution Control Board Central Polluted and Control Board D Center for Pollution and Climate Board **Topic Name:** Aptitude Test – Part II The Basilica of Bom Jesus, a UNESCO world heritage site is located in which Ouestion: state of India? A Daman

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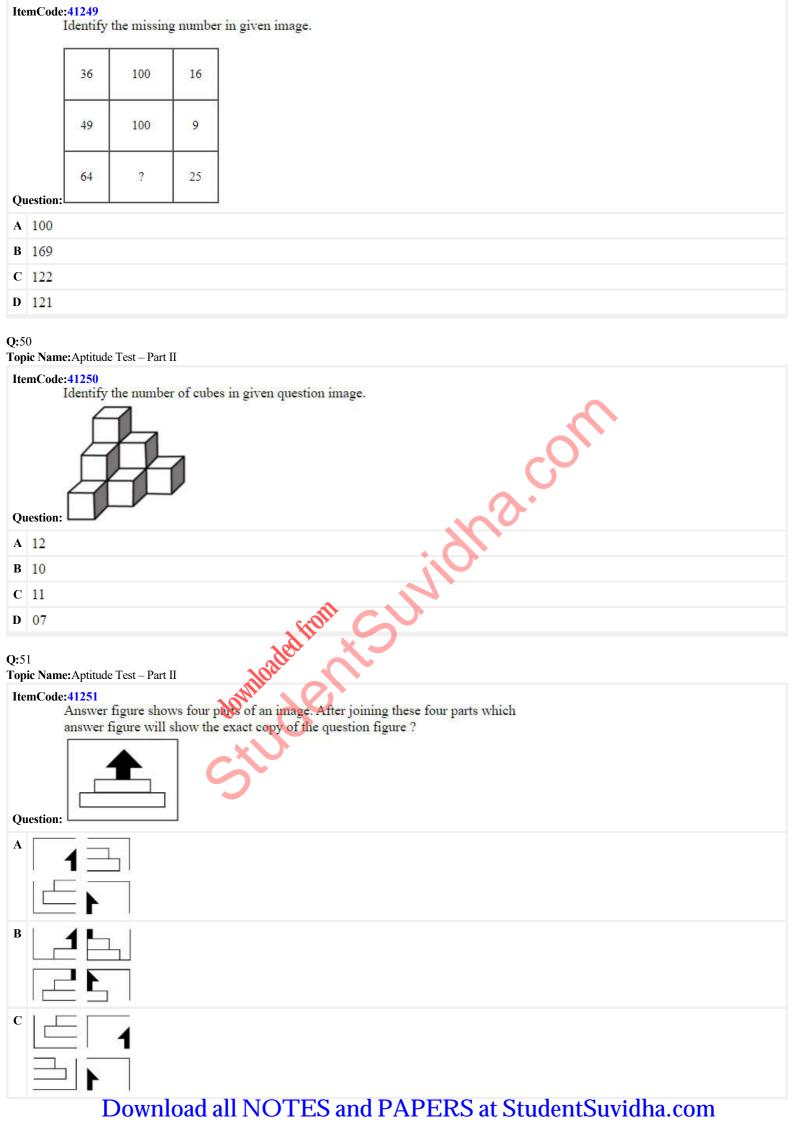
B Kerala

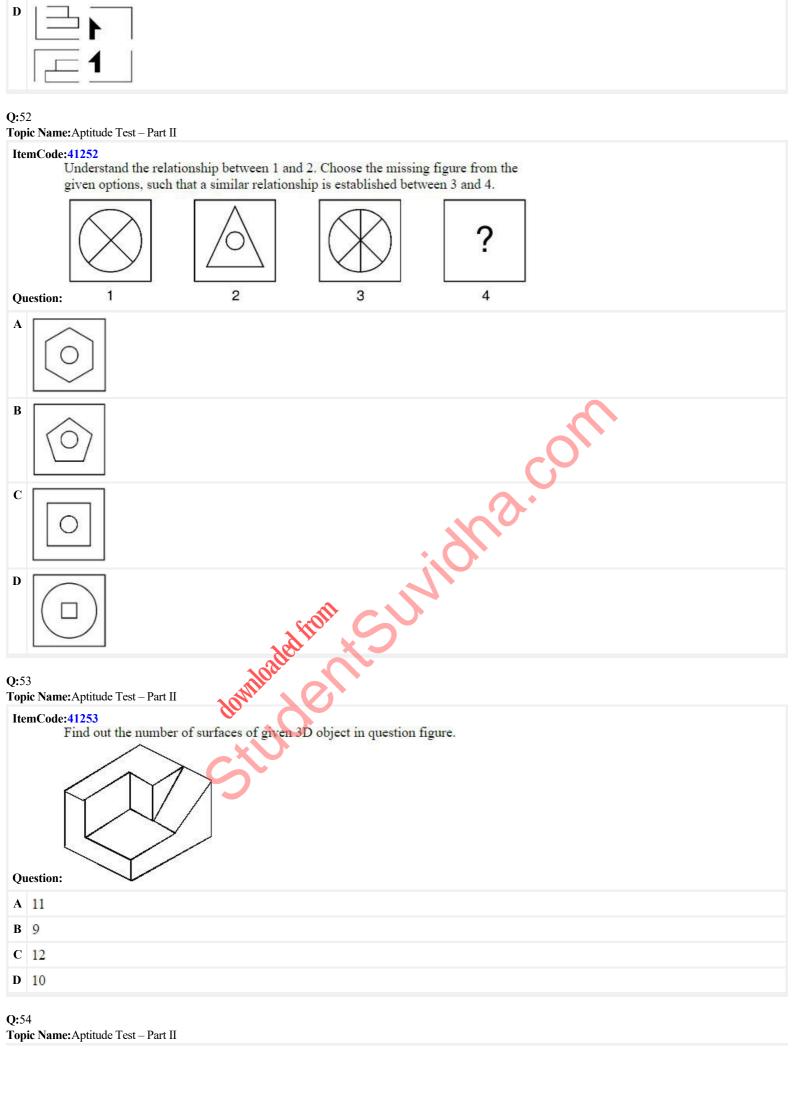
C	Goa
D	Andaman and Nicobar Island
Q:36	ic Name: Aptitude Test – Part II
	mCode:41236 estion: The 'Vitruvian Man' is a drawing made by
A	Rambrant
В	Raphael
C	Leonardo da Vinci
D	Picasso
Ite	ic Name: Aptitude Test – Part II mCode: 41237 estion: In which of the following Indian state 'The Garo-Khasi range' is located.
A	Mizoram
В	Meghalaya
C	Nagaland
D	Manipur
	S ic Name: Aptitude Test – Part II mCode: 41238
	Buildings situated in hills will required to consider which of the following phenomeanas, primarily? estion: (a) Tsunami (b) Hail (c) High Tide (d) Land slide (e) Dust storm (f) Snow
A	b, c, d
В	b, e, f
C	b, d, f
D	a, b, f
Q:39	b, e, f b, d, f a, b, f ic Name: Aptitude Test – Part II mCode: 41239
	mCode:41239
Qu	estion: 'Vienna Peace Congress' was held during which of the following years?
A	1813-1814
	1814-1815
	1815-1816
D	1812-1813
Q:40 Topi	ic Name: Aptitude Test – Part II
Ite Qu	mCode:41240 estion: Which of the following is the longest river of the peninsular India ?
A	Narmada
В	Godavari
C	Mahanadi
D	Тарі
Q:41 Topi	I ic Name: Aptitud Downal load all NOTES and PAPERS at Student Suvidha.com

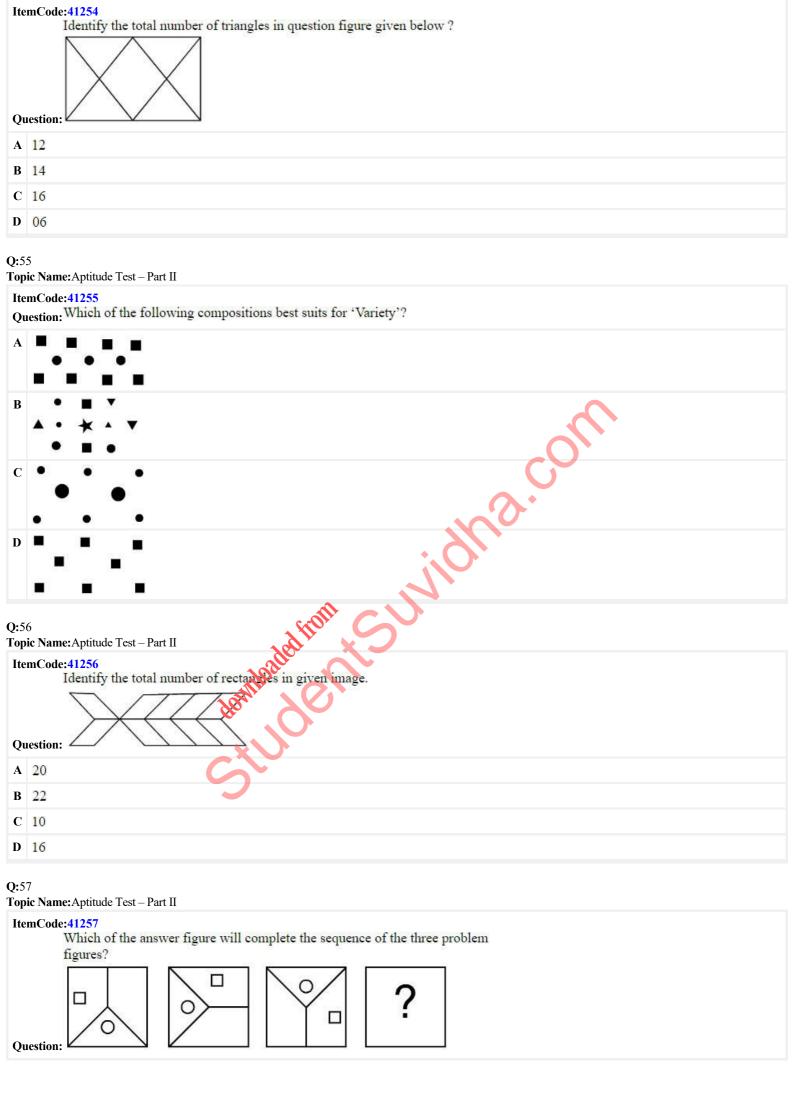
East			
B West			
C Far to the North-East			
D Far North-West			
9:42 opic Name: Aptitude Test – Part II			
temCode:41242 Match the Architectural style	given in List-I with the famous Building in List-II		
SEO.			
List-I A. Industrial Building Style B. Brutalist Style C. Blogitecture Style D. Gothic Architectural Style	List-II I. The Burlin Brain Library, Burlin II. Westminister Abbey III. Eiffel Tower IV. Secretariat Building, Chandigar		
Question: Choose the correct option.			
A A-II, B-III, C-IV, D-I			
B A-III, B-IV, C-II, D-I			
A-III, B-IV, C-I, D-II			
A-IV, B-I, C-II, D-III	-01		
9:43 opic Name: Aptitude Test – Part II			
middle to take advantage of the Statement II: The white Marb Question: red sandstone of the surround	le of Taj Mahal is used to achieve contrast with the		
A Both Statement I and Statement II	are correct.		
B Both Statement I and Statement II	are not correct		
Statement I is correct but Statement I is not correct			
Statement I is correct but Statemen	t It is not correct		
	0.		
Statement I is not correct but States 2:44 opic Name: Aptitude Test – Part II	0.		
Statement I is not correct but States:44 opic Name: Aptitude Test – Part II (temCode: 41244	0.		
Statement I is not correct but State 2:44 opic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a	nent II is correct		
Statement I is not correct but State :44 opic Name: Aptitude Test – Part II (temCode: 41244 Question: How many minimum points a	nent II is correct		
Statement I is not correct but State :44 opic Name: Aptitude Test – Part II temCode: 41244 Question: How many minimum points a A One B Three	nent II is correct		
D Statement I is not correct but States 2:44 Sopic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a A One B Three C Two	nent II is correct		
Statement I is not correct but State :44 opic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a A One B Three C Two D Four	nent II is correct		
Statement I is not correct but State 2:44 opic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a A One B Three C Two D Four	nent II is correct		
D Statement I is not correct but State 2:44 Copic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a A One B Three C Two D Four 2:45 Copic Name: Aptitude Test – Part II ItemCode: 41245 An external wall of a room ha and B are same i.e. having wi same as of A and B. Width of	nent II is correct		
D Statement I is not correct but State 2:44 Copic Name: Aptitude Test – Part II ItemCode: 41244 Question: How many minimum points a A One B Three C Two D Four 2:45 Copic Name: Aptitude Test – Part II ItemCode: 41245 An external wall of a room ha and B are same i.e. having wi	hent II is correct are required to connect to create a 2D plane? as 4 opening for windows (i.e. A, B, C, D). size of A dth of 1.0 m and height 1.5 m. Height of C and D is		

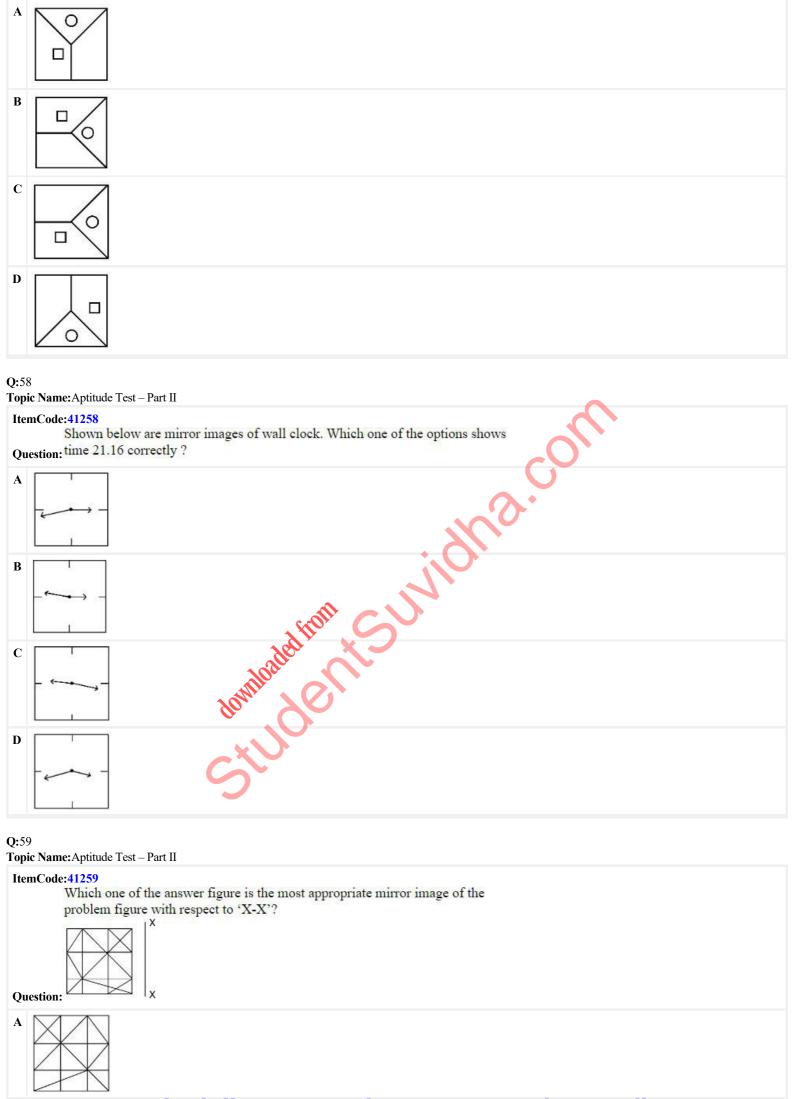
D 2.0 m **Q**:46 **Topic Name:** Aptitude Test – Part II ItemCode:41246 Prestigious international Aga Khan award winning project, 'Slum Networking', a Question: community driven approach, at Indore is designed by ____? A Himanshu Parikh B Uttam Jain Hasmukh Patel Neelam Manjunath **Q:**47 Topic Name: Aptitude Test – Part II ItemCode:41247 'The Garden of the Heart' documentary is based on which of the following Question: renowned architect? Santiago Culatrava B Renzo Piano Kisho Kurokawa Joseph Allen Stein **Q:**48 Topic Name: Aptitude Test - Part II ItemCode:41248 List-I List-II I. India Habitat Centre by Stein Joseph genheim Museum by Frank Lloyd III. Modern school, New Delhi by Jasbir Sachdev & Rosmerry Sachdev IV. Heydear Aliyev Centre by Zaha Hadid **Question:** A A-I, B-II, C-III, D-IV A-III, B-I, C-II, D-IV A-III, B-I, C-IV, D-II A-I, B-III, C-IV, D-II Topic Name: Aptitude Test – Part II

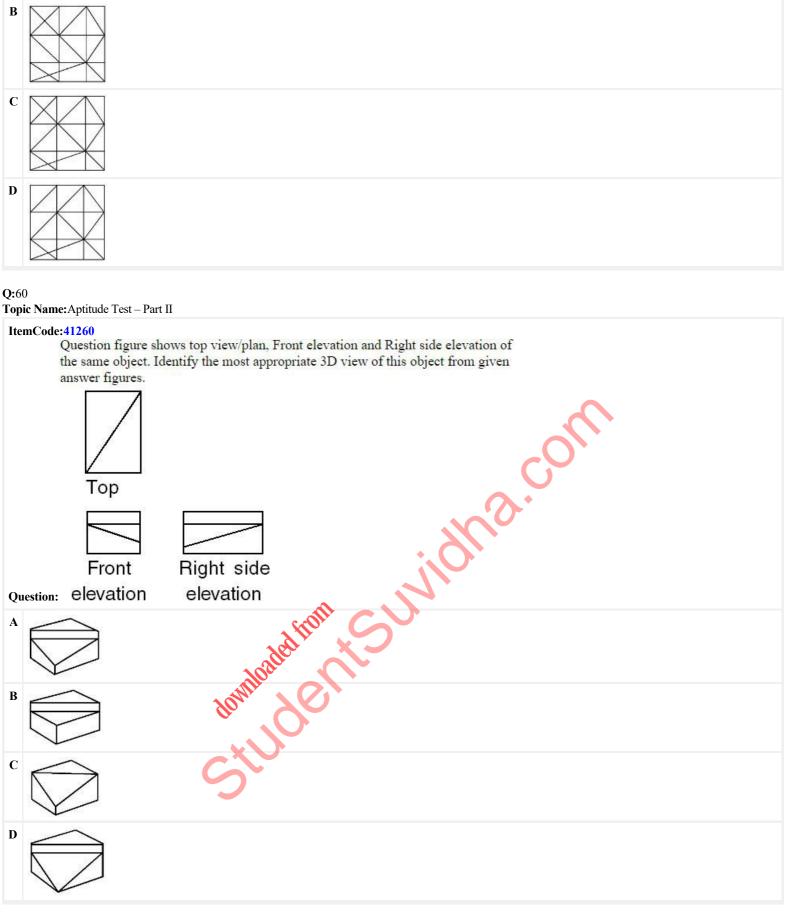
C 2.5 m



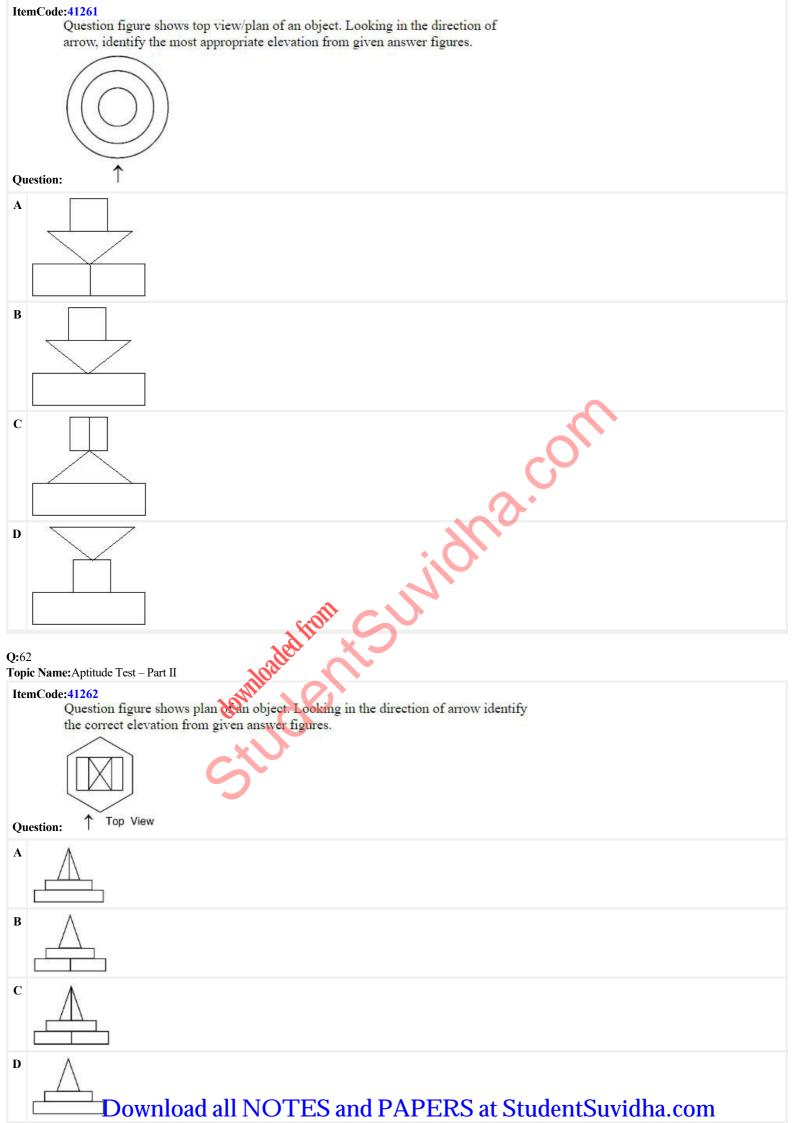


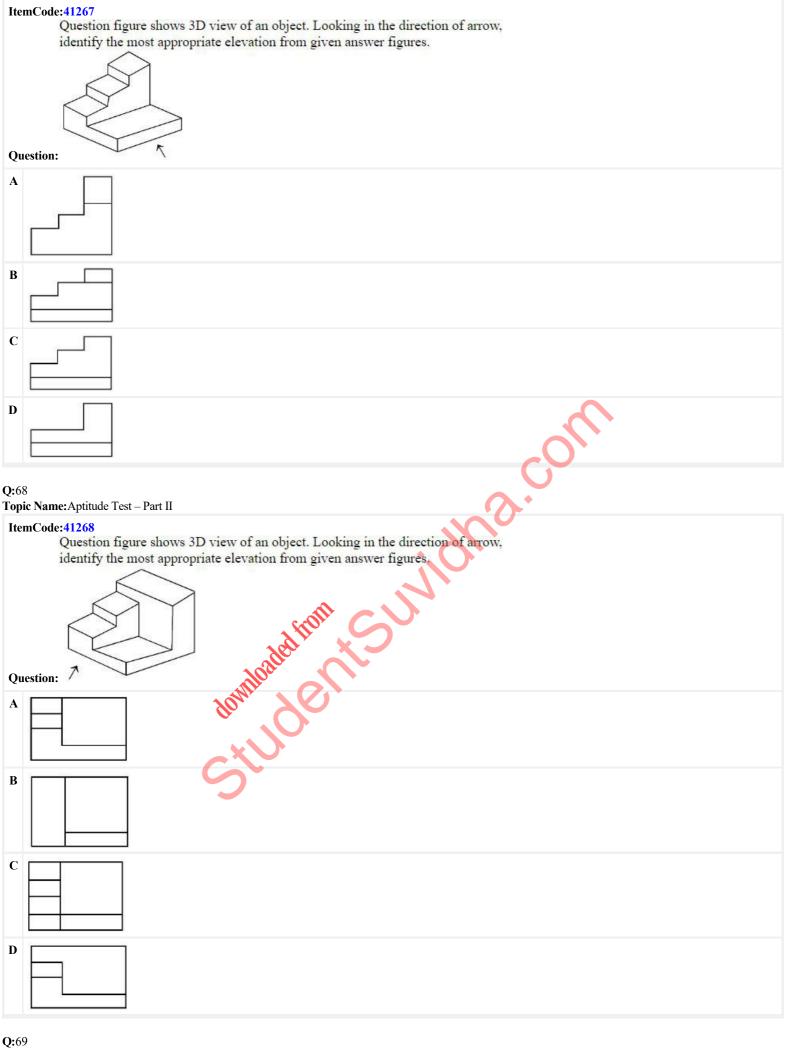


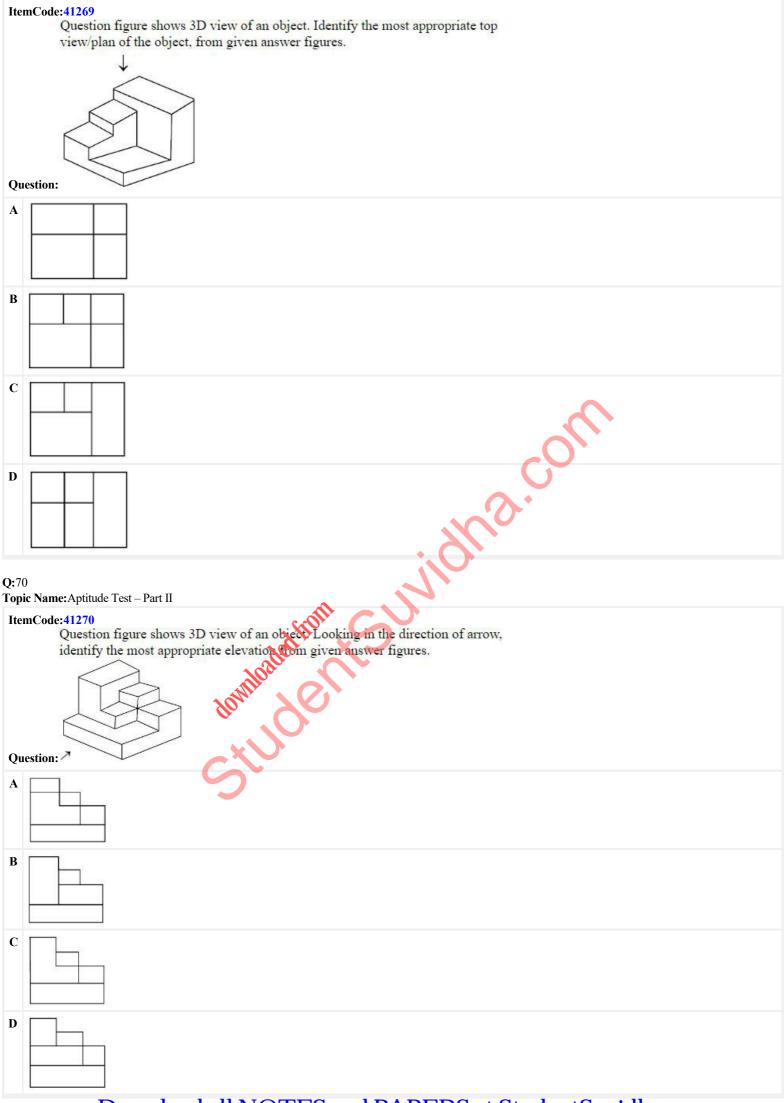




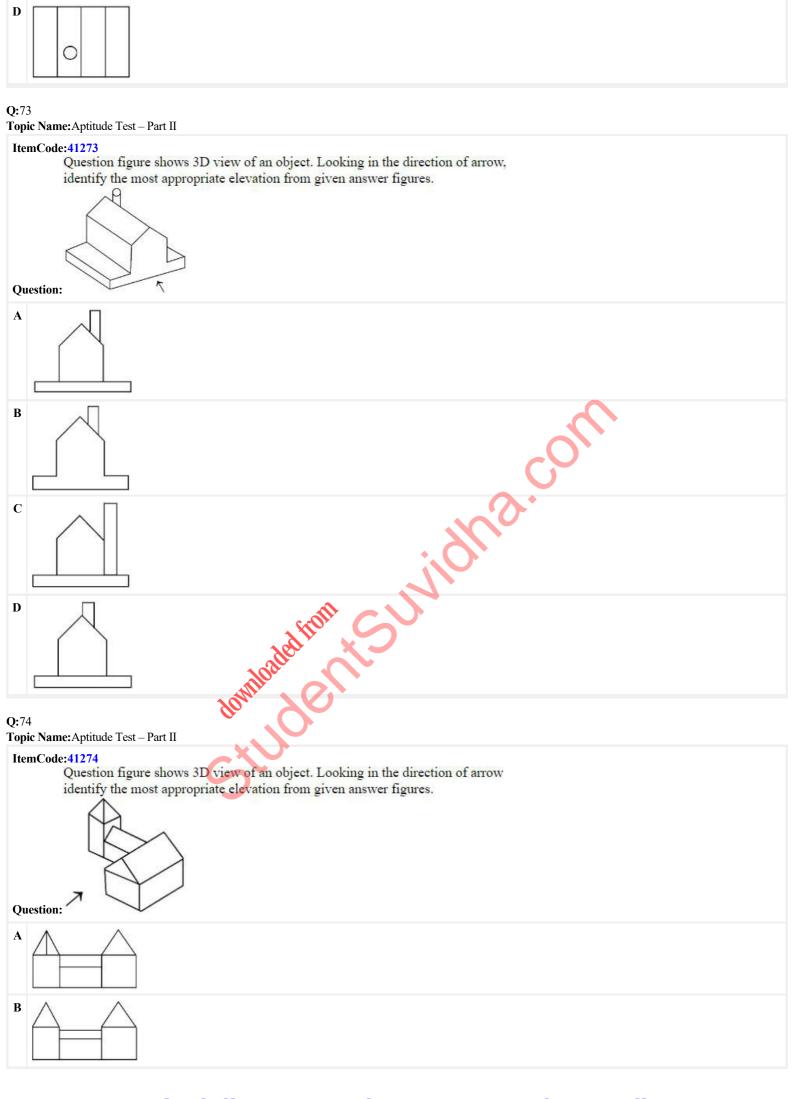
Q:61

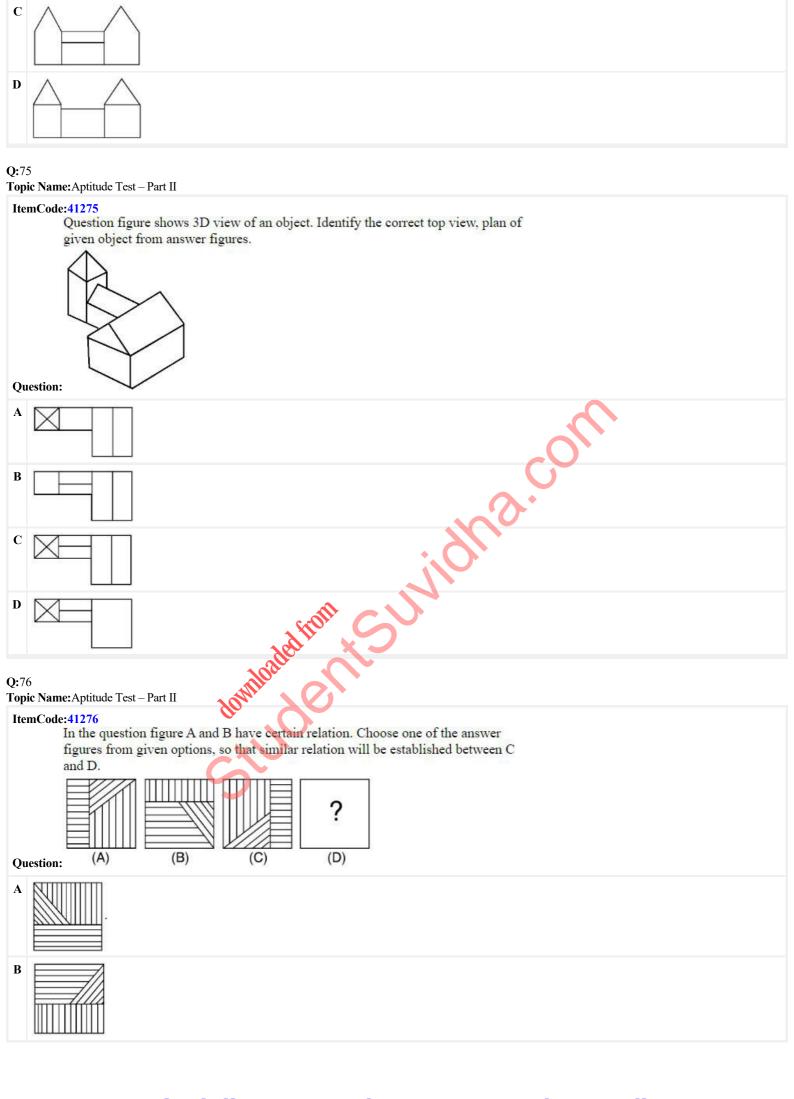


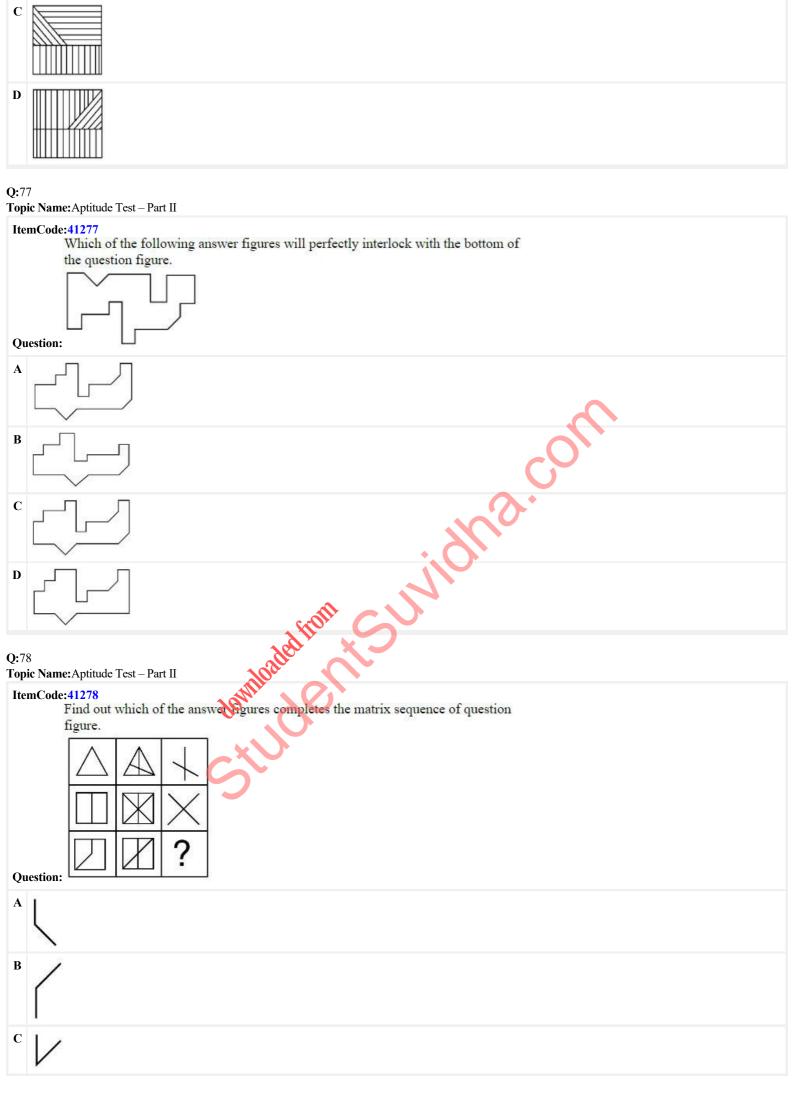




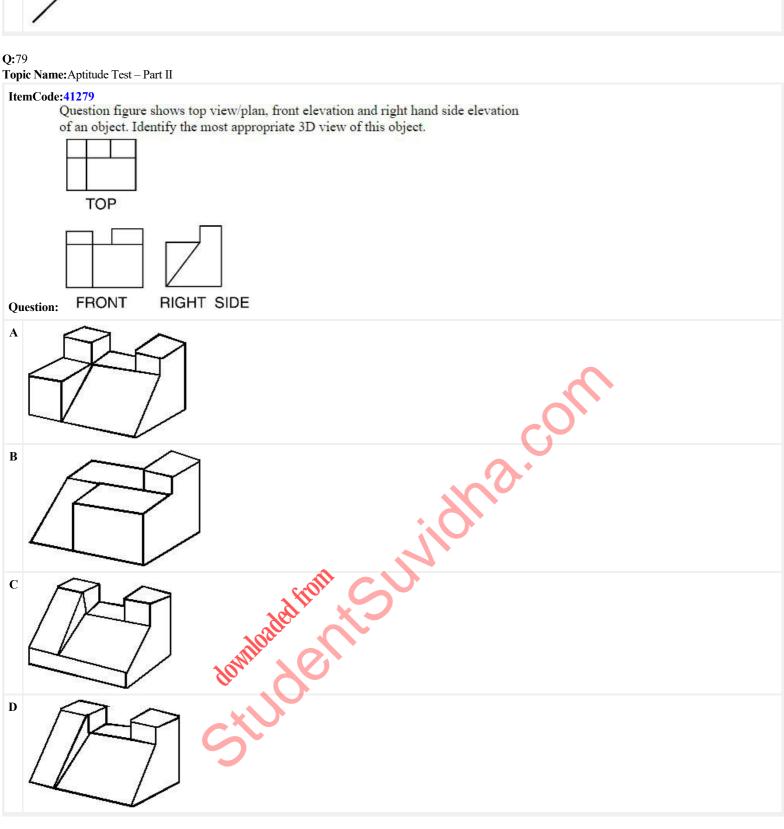
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Q:80

D

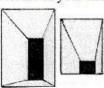


ItemCode:41282

Draw a picture of any sports event you have attended. Use colours of your choice to render the picture.

OR

Using given figure of various sizes create a Jali partition of suitable size. Use colours of your choice to render the composition.









Question:

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