

Home Assignment

for SSC & Railways Aspirants



1. Which of the following state government has launched the database portal 'academisthan.com' to serve as a resource centre for educational institutions to make better policy decisions?

- A. Delhi B. Gujarat
C. Rajasthan D. Maharashtra
E. Uttar Pradesh

Ans. D

Sol. • Maharashtra Higher & Technical Education Minister Vinod Tawde has launched the database portal 'academisthan.com' to serve as a resource centre for educational institutions to make better policy decisions.

- The portal will serve as a resource centre for educational institutions in government, semi-government and private sectors to develop their policies and other activities.
- This will open a new window of resources for educational institutes.
- The database will help in providing requisite information to government agencies, NGOs and others to aid in making policy decisions, perspective plans and allocation of resources related to higher education.

2. Who is appointed as the next Chairman-cum-Managing Director of Coal India Limited?

- A. B Veera Reddy B. Pramod Agarwal
C. Anil Kumar Jha D. Sanjeev Singhal
E. Manoj Mathur

Ans. B

Sol. • Senior IAS officer (1991 batch: Madhya Pradesh cadre) Pramod Agarwal (53-year) has been selected as the next Chairman-cum-Managing Director of Coal India Limited.

- He will succeed incumbent Chairman Anil Kumar Jha (retire in January 2020).
- The Coal India Limited (CIL) is an Indian state-controlled coal mining company headquartered in Kolkata, West Bengal, India.
- It is the largest coal-producing company in the world.

3. A mobile app _____ has been launched to help para-athletes to look

up accessible places in Tokyo during their visit to the city for the 2020 Paralympics Games.

- A. Tokyo20 B. IndTokyo
C. Paralympics2020 D. IndiaTokyo2020
E. None of these

Ans. B

Sol. • A mobile app '**IndTokyo**' has been launched to help para-athletes to look up accessible places in Tokyo during their visit to the city for the 2020 Paralympics Games.

- The application 'IndTokyo' was launched by Arhan Bagati, Awareness and Impact Ambassador of Paralympic Committee of India, at the 'Countdown to Tokyo 2020'.
- It has features like information on para-athletes and accessible places in Tokyo among others.

4. Who among the following has topped the Forbes' list 2019 of highest paid female actors in the world?

- A. Sofia Vergara
B. Nicole Kidman
C. Jennifer Aniston
D. Scarlett Johansson
E. Kaley Cuoco

Ans. D

Sol. • For the second consecutive year, Hollywood star **Scarlett Johansson** has topped the Forbes' list of highest-paid female actors in the world.

- Spurred by the success of her summer Marvel film Avengers: Endgame, the 34-year-old actor's earning reached **USD 56 million**.

5. The question below consists of a set of labelled sentences. These sentences, when properly sequenced form a coherent paragraph. Select the most logical order of sentences from among the options.

P: Two things play a very big role according to personality and those are the dressing sense and the knowledge.

Q: Personality determines the image of the person in the society.

R: If person is rich and having good and expensive clothes so his personality is better than other

people.

S: More important is knowledge but in today's society people give more preference to the dressing sense.

- A. QSRP B. QPSR
C. PQRS D. SRQP

Ans. B

Sol. Q is clearly the first statement as it introduces the main idea of the paragraph, that is, Personality. P gives basic information about the personality i.e, important things to judge a person's personality. Sentence S must follow sentence P because P says about the two things, dressing sense and knowledge and the more importance is given to knowledge, which is mentioned in sentence S. Thus, the sequence after rearrangement is QPSR and option B is the correct answer.

6. _____ is not a web browser.

- A. Netscape
B. Mozilla
C. Internet Explorer
D. Chrome
E. Telnet

Ans. E

Sol. **Telnet** is not a **web browser**. Telnet is a user command and an **underlying TCP/IP protocol** for accessing remote computers.

7. Improve the bracketed part of the sentence.

Tax-payers (are to) be conscious of their privileges.

- A. could B. No improvement
C. have to D. might

Ans. C

Sol. The given sentence shows a necessity for the taxpayers to be aware of their rights and privileges. The use of "are to" is not showing the urgency here and should be replaced by "have to". Let's understand the difference in their use:

have to be expresses a prerequisite for the tax-payers. If the tax-payers are not aware of their privileges, they will not be benefitted. It is therefore closely related to "the taxpayers **must** conscious of their privileges."

are to be expresses a lower sense of necessity. It has less emphasis on the "must", and instead, it seems to convey that "this is always the case so the taxpayers will also be conscious of their privileges this time".

8. Improve the bracketed part of the sentence.

The boxer was knocked out, but (came out) in a few seconds.

- A. came up
B. came on
C. came round
D. No improvement.

Ans. C

Sol. Let's understand the meaning of each phrasal verb in order to find out which one fits best in the sentence:

Come up = occur or present itself, especially unexpectedly especially an issue, situation, or problem

Come on = start to arrive or happen

Come round = recover consciousness after being unconscious

Come out = (of a fact) emerge; become known

As per the context of the sentence, "came round" is the correct phrasal verb to be used in the sentence.

9.

$$\text{If, } a + \frac{1}{a} = 3, \text{ then find } \frac{a^3 + 1}{a^4} \cdot 2 \left(\frac{a+1}{a^3} \right) \left(a - \frac{1}{a} \right)$$

- A. $1/\sqrt{6}$ B. $1/\sqrt{5}$
C. $1/6$ D. $1/\sqrt{3}$

Ans. B

Sol. Given,

$$a + \frac{1}{a} = 3 \dots\dots (i)$$

$$\Rightarrow a^2 + 1 = 3a$$

$$\Rightarrow a^2 - 2a - a + 1 = 0$$

$$\Rightarrow a^2 - a + 1 = 2a$$

Also, squaring both sides of (i)

We get,

$$\Rightarrow a^2 + \frac{1}{a^2} + 2 = 9$$

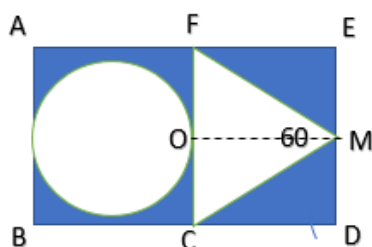
$$\Rightarrow a^2 + \frac{1}{a^2} = 7$$

$$\begin{aligned} \therefore \left(a - \frac{1}{a}\right)^2 &= a^2 + \frac{1}{a^2} - 2 = 7 - 2 = 5 \\ \Rightarrow \left(a - \frac{1}{a}\right) &= \sqrt{5} \\ \therefore \frac{a^3 + 1}{a^4} &= \frac{(a+1)(a^2 - a + 1)}{a^4} = \frac{(a+1) \cdot 2a}{a^4} = \frac{2(a+1)}{a^3} \\ \therefore \frac{2(a+1)}{a^3} &= \frac{1}{\left(a - \frac{1}{a}\right)} \\ \Rightarrow 1/\sqrt{5} \end{aligned}$$

10. In the following figure

$BC = CD, EM = MD, AB \parallel FC \parallel ED$,
 $\angle FMC = 60^\circ$ and $AB = \frac{28}{\sqrt{3}}$. Find the

area of shaded region?



- A. $14(14\sqrt{3} - 11)$
 B. $14(14\sqrt{3} + 11)$
 C. $28(14\sqrt{3} - 11)$
 D. $42(14\sqrt{3} - 11)$

Ans. A

Sol. Given

$$AB = \frac{28}{\sqrt{3}} \Rightarrow FC = \frac{28}{\sqrt{3}}$$

Now since

$\triangle FEM$ and $\triangle CDM$ are similar

$$\angle FME = \angle DMC = \frac{120^\circ}{2} = 60^\circ$$

and since $FC \parallel ED$, $\angle MFC = \angle FME = 60^\circ$
 and $\angle MCF = \angle DMC = 60^\circ$.

So, $\triangle FCM$ is an equilateral triangle

$$\tan(\angle MFO) = \tan 60^\circ = \frac{MO}{FO} = \frac{MO}{\frac{FC}{2}} = \frac{2MO}{FC}$$

$$MO = \frac{FC}{2} \times \sqrt{3} = \frac{1}{2} \left(\frac{28}{\sqrt{3}} \times \sqrt{3} \right) = 14$$

$$BC = CD = OM = 14$$

Diameter of circle

$$2r = 14 \Rightarrow r = 7$$

Area of full rectangle

$$= AB \times BD = AB \times (2BC) = \frac{28}{\sqrt{3}} \times 28 = \frac{784}{\sqrt{3}}$$

Area of

$$\triangle FCM = \frac{\sqrt{3}}{4} (FC)^2 = \frac{\sqrt{3}}{4} \times \left(\frac{28}{\sqrt{3}} \right)^2 = \frac{196}{\sqrt{3}}$$

Area of circle

$$= \pi r^2 = \frac{22}{7} \times (7)^2 = 154$$

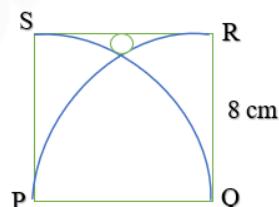
Area of shaded

region

$$= \frac{784}{\sqrt{3}} - \left(\frac{196}{\sqrt{3}} + 154 \right) = \frac{588}{\sqrt{3}} - 154$$

$$= 196\sqrt{3} - 154 = 14(14\sqrt{3} - 11)$$

11. In the given figure PQRS is a square whose side is 8 cm. PQS and QPR are two quadrants. A circle is placed touching both quadrants and the square as shown in the figure. What is the area (in cm^2) of circle?



A. $\frac{11}{14} \text{ cm}^2$

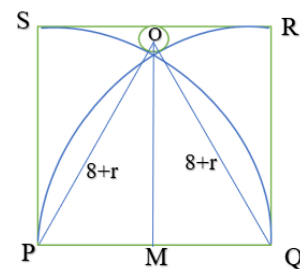
B. $\frac{14}{11} \text{ cm}^2$

C. $\frac{11}{12} \text{ cm}^2$

D. $\frac{6}{7} \text{ cm}^2$

Ans. A

Sol.



Let O be the center of smaller circle and r be its radius. Let x be the radius of bigger circle (quadrants).

Then $x = 8 \text{ cm}$. Joining O with

P and Q. We get

an isosceles triangle. Draw

$OM \perp PQ$

From figure

$$OP = OQ = 8 + r$$

$$OM = 8 - r$$

In triangle $\triangle OMP$,

$$OP^2 = OM^2 + PM^2$$

$$(8 + r)^2 = (8 - r)^2 + (4)^2$$

$$(8 + r)^2 - (8 - r)^2 = 16$$

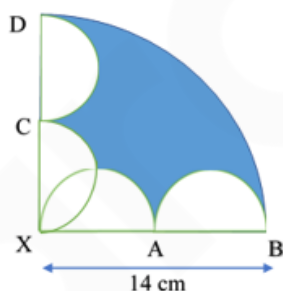
$$4 \times 8 \times r = 16 \Rightarrow r = \frac{1}{2} \text{ cm}$$

Area of smaller circle

$$= \pi \left(\frac{1}{2}\right)^2 = \frac{22}{7} \times \frac{1}{4}$$

$$= \frac{11}{14} \text{ cm}^2$$

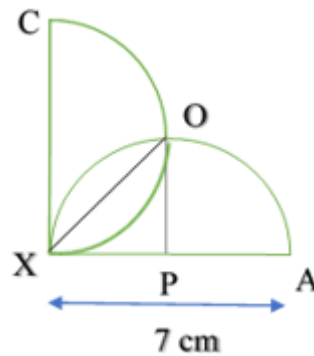
12. In the given figure, four identical semicircles are drawn in quadrant. $XA = 7 \text{ cm}$. What is the area (in cm^2) of shaded region?



- A. 70 cm^2 B. 140 cm^2
C. 77 cm^2 D. 84 cm^2

Ans. D

Sol.



Area of entire quadrant (XBD)

$$= \frac{\pi}{4} (14)^2 = \frac{22}{7 \times 4} \times 196 = 154 \text{ cm}^2$$

Area of 4 semicircles

$$= 4 \times \frac{\pi}{2} \left(\frac{7}{2}\right)^2 = 77 \text{ cm}^2$$

Since $XA = 7 \text{ cm}$

therefore,

$$XP = PA = \frac{7}{2} \text{ cm}$$

Area of intersection of two semicircles

$= 2 \times (\text{Area of quadrant XOP} - \text{Area of } \triangle XOP)$

$$= 2 \times \left(\frac{\pi}{4} (XP)^2 - \frac{1}{2} \times XP \times OP \right)$$

$$= 2 \times \left(\frac{22}{7 \times 4} \times \frac{49}{4} - \frac{1}{2} \times \frac{7}{2} \times \frac{7}{2} \right)$$

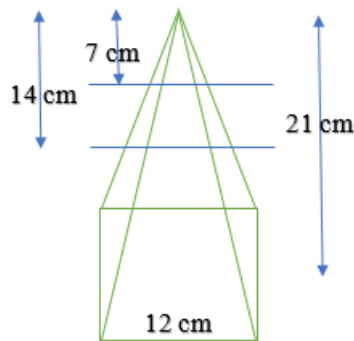
$$= 2 \times \left(\frac{77}{8} - \frac{49}{8} \right) = 2 \times \frac{28}{8} = 7 \text{ cm}^2$$

Required area of shaded region

$= \text{Area of entire quadrant (XBD)} - \text{Area of 4 semicircles} + \text{Area of intersection of two semicircles}$

$$= 154 - 77 + 7 = 84 \text{ cm}^2$$

13. A pyramid has a square base. The side of square is 12 cm and height of pyramid is 21 cm. The pyramid is cut into 3 parts by 2 cuts parallel to its base. The cuts are at height of 7 cm and 14 cm respectively from the base. What is the difference (in cm^3) in the volume of top most and bottom part?



- A. 672 B. 944
C. 786 D. 918

Ans. A

Sol. Since the height of pyramid = 21 cm

And it has been divided in 3 parts equally.

Consider 3 pyramids oh heights

7 cm, 14 cm

and

21 cm respectively.

Then ratio of heights of pyramids

= 7:14:21

= 1:2:3

Ratio of volumes of pyramids

= $1^3:2^3:3^3 = 1:8:27$

Ratio of volumes of 3 parts

= $1:(8-1):(27-8) = 1:7:19$

Hence total volume (of biggest pyramid)

= $27x = \frac{1}{3} \times (12)^2 \times 21$

$x = \frac{1}{3} \times 144 \times 21 \times \frac{1}{27} = \frac{112}{3}$

The difference in the volume of top most and bottom part

= $(19-1) \times \frac{112}{3} = 672 \text{ cm}^3$

14. In the following question, select the number which can be placed at the sign of question mark (?) from the given alternatives.

3	5
2	6
8	1

2	4
3	8
2	6

9	3
2	1
7	?

- A. 1 B. 2
C. 3 D. 4

Ans. C

Sol. In matrix

I: $3 + 5 + 2 + 6 + 8 + 1 = 25$

In matrix II:

$2 + 4 + 3 + 8 + 2 + 6 = 25$

Similarly,

In matrix III: $9 + 3 + 2 + 1 + 7 + ? = 25$

$\Rightarrow 22 + ? = 25$

$\Rightarrow ? = 3$

Thus the missing number is 3.

15. If in some language JAGUAR is coded as "117319" and FERRARI is coded as "6599199", then what is the code for MASERATI?

- A. 411059487 B. 411059129
C. 411659129 D. 411059130
E. 423059129

Ans. B

Sol.

Alphabet	A	B	C	D	E	F	G	H	I	J	K	L	M
Position value	1	2	3	4	5	6	7	8	9	10	11	12	13
Alphabet	Z	Y	X	W	V	U	T	S	R	Q	P	O	N
Position value	26	25	24	23	22	21	20	19	18	17	16	15	14

Considering the place value of letters we get,

As,

J(10), A(1), G(7), U(21), A(1), R(18)

$\Rightarrow J(1+0), A(1), G(7), U(2+1), A(1), R(1+8)$

$\Rightarrow 117319$

and

F(6), E(5), R(18), R(18), A(1), R(18), I(9)

$\Rightarrow F(6), E(5), R(1+8), R(1+8), A(1), R(1+8)$

, I(9)

$\Rightarrow 6599199$

Similarly, MASERATI is coded as

M(13), A(1), S(19), E(5), R(18), A(1), T(20),

I(9)

$\Rightarrow M(1+3), A(1), S(1+9), E(5), R(1+8), A(1)$

, T(2+0), I(9)

$\Rightarrow 411059129$

Hence, option B is the correct answer.

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