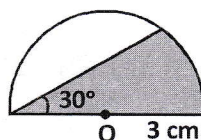


- 01** The mid-points of the sides AB and AC of a  $\Delta ABC$  are (3, 5) and (-3, -3) respectively. What is the length of the side BC ?
- (A) 10 units                      (B) 20 units  
(C) 15 units                      (D) 30 units
- 02** If 18<sup>th</sup> and 11<sup>th</sup> terms of an AP are in the ratio 3 : 2, then find the ratio of their 29<sup>th</sup> and 5<sup>th</sup> terms.
- (A) 3 : 1                          (B) 1 : 4  
(C) 4 : 1                          (D) 1 : 3
- 03** In an Arithmetic Progression  $n^{\text{th}}$  term is  $(4n + 1)$  find the sum of first 'n' terms of the given A.P.
- (A)  $(n^2 + 2n)$                       (B)  $(2n^2 + 3n)$   
(C)  $(3n^2 + 4n)$                       (D)  $(4n^2 + 5n)$
- 04** The remainder when a number is divided by 143 is 31. What is the remainder when the same number is divided by 11 ?
- (A) 5                                  (B) 7  
(C) 6                                  (D) 9

Space for rough work

- 05** In the given figure, one side of the  $30^\circ$  inscribed angle is the diameter of a semicircle of radius 3 cm. What is the perimeter of the shaded region bounded by the inscribed angle and its intercepted arc ?



- (A)  $(9\sqrt{3} + \pi)$  cm      (B) 14.34 cm  
 (C)  $(6\sqrt{3} + \pi)$  cm      (D) 17.56 cm
- 06** If  $A(-1, -1)$ ,  $B(2, 3)$  and  $C(8, 11)$  are the vertices of  $\Delta ABC$ . What is area of the  $\Delta ABC$  ?
- (A) zero square units      (B) 4 square units  
 (C) 24 square units      (D) 16 square units
- 07** Identify the simplest value of

$$(\cot^2 30^\circ + \tan^2 60^\circ - \frac{3}{4} \sin^2 45^\circ + \operatorname{cosec}^2 30^\circ)$$

- (A)  $\frac{75}{8}$       (B)  $\frac{76}{8}$       (C)  $\frac{77}{8}$       (D)  $\frac{79}{8}$

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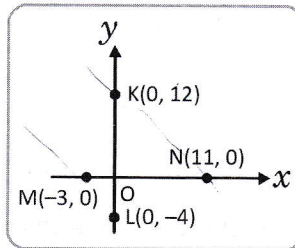


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**08** In  $\Delta ABC$ ,  $A = (2, 3)$  and mid point of  $BC = (5, 0)$ . Identify the centroid of  $\Delta ABC$ .

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

**09** In the diagram,  $K, L, M$  &  $N$  are points on a cartesian plane.



Which of the following points lie on both the perpendicular bisectors of  $KL$  and  $MN$  ?

- (A) (4, 0)                      (B) (4, 4)  
 (C) (0, 4)                      (D) (-4, 0)

Space for rough work

- 10** If one of the zeros of the cubic polynomial  $x^3 + ax^2 + bx + c$  is  $-1$ , then what is the product of the other two zeros ?
- (A)  $(b - a - 1)$                       (B)  $(a - b + 1)$   
 (C)  $(b - a + 1)$                       (D)  $(a - b - 1)$
- 11** Choose the result of  $(\cos^2 0^\circ + \cos^2 1^\circ + \cos^2 2^\circ + \dots + \cos^2 88^\circ + \cos^2 89^\circ + \cos^2 90^\circ)$
- (A) 44                                      (B) 44.5  
 (C) 45                                      (D) 45.5
- 12** The height of a cone is 21 cm and the semivertical angle is  $45^\circ$ . Choose the volume of the cone.
- (A)  $8686 \text{ cm}^3$                       (B)  $9702 \text{ cm}^3$   
 (C)  $9848 \text{ cm}^3$                       (D)  $4566 \text{ cm}^3$

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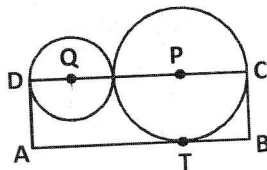
$$\begin{array}{r}
 36 \\
 + 64 \\
 \hline
 100
 \end{array}$$

$$\frac{1103}{7}$$

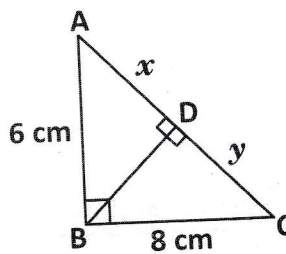
$$\frac{22}{7} \times 5$$

$$= 14$$

- 13 Two circles with centres P and Q are as shown in the figure. If the area of rectangle ABCD is 15 sq.cm., then what is the area of  $\Delta QPT$  ?



- (A)  $\frac{12}{7}$  cm<sup>2</sup>                      (B) 3.75 cm<sup>2</sup>  
 (C) 2.84 cm<sup>2</sup>                      (D)  $\frac{16}{5}$  cm<sup>2</sup>
- 14 Find  $x$  from the given figure.



- (A) 3.6 cm                      (B) 3.4 cm  
 (C) 6.4 cm                      (D) 6.6 cm

Space for rough work

$$AC^2 = AB^2 + BC^2$$

$$AC^2 = (6)^2 + (8)^2$$

$$= 36 + 64$$

$$= 100$$

$$AC = \sqrt{100} = 10$$

15 The perimeters of the ends of the frustum of a cone are 132 cm and  $62\frac{6}{7}$  cm. If the slant height of the frustum is 61 cm, then choose the volume of the frustum.

(A)  $44,569\frac{2}{7}$  cm<sup>3</sup>      (B)  $47,205\frac{5}{7}$  cm<sup>3</sup>

(C)  $38,469\frac{2}{7}$  cm<sup>3</sup>      (D) 15,654 cm<sup>3</sup>

16 What is the value of  $\left( \sqrt{4 + \sqrt{4 + \sqrt{4 + \sqrt{4 + \dots \infty}}}} \right)$  ?

(A) 4

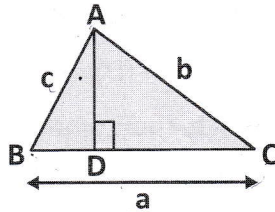
(B)  $\frac{\sqrt{17}-1}{2}$

(C)  $\frac{\sqrt{17}+1}{2}$

(D) 0

Space for rough work

- 17** In the given figure,  $AD \perp BC$ ,  $BC = a$ ,  $CA = b$ , and  $AB = c$ .  
If  $BD = \frac{1}{3} CD$ , then what is the value of  $2b^2$ ?



- (A)  $a^2 - 2c^2$                       (B)  $2a^2 + c^2$   
(C)  $c^2 - 2a^2$                       (D)  $a^2 + 2c^2$
- 18** If  $3748x + 5467y = 10,085$ ,  
 $1731x + 7484y = 4034$ , then choose the value of  $(x - y)$ .
- (A) 1023                      (B) 1024  
(C) 4                      (D) 3
- 19** If  $a$ ,  $b$  and  $c$  are in Arithmetic Progression, the straight line  $ax + by + c = 0$  will always pass through the point \_\_\_\_\_.
- (A)  $(-1, -2)$                       (B)  $(-1, 2)$   
(C)  $(1, -2)$                       (D)  $(1, 2)$

Space for rough work

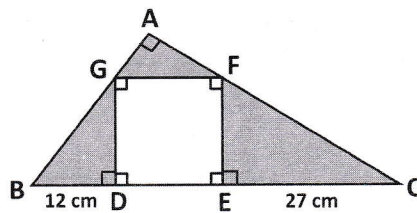
**20** From a 50 m tall building, the angles of depression of the top and foot of a temple are found to be  $30^\circ$  and  $60^\circ$  respectively. What is the height of the temple ?

- (A) 36 m                      (B) 25.3 m  
(C) 33.33 m                (D) 30 m

**21** If  $\tan 4\theta \times \tan 5\theta = 1$ , then what is the measure of  $\theta$  ?

- (A)  $25^\circ$                       (B)  $15^\circ$   
(C)  $10^\circ$                       (D)  $45^\circ$

**22** In the given figure,  $\triangle ABC$  is right angled at A. DEFG is a square,  $BD = 12$  cm and  $EC = 27$  cm. What is the length of GF ?



- (A) 27 cm                      (B) 19 cm  
(C) 12 cm                      (D) 18 cm

Space for rough work

$$\begin{array}{r} 2 \\ \times 25 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 15 \\ \times 4 \\ \hline \end{array}$$



- 23** Two concentric circles are drawn. There are 5 chords of big circles which are tangents to small circle then length of all chords are
- (A) Different                      (B) Same length  
(C) 5 cm                              (D) Can't find
- 24** The sum of the squares of three consecutive positive integers is 50. Find the sum of the numbers.
- (A) 24                                  (B) 21  
(C) 15                                  (D) 12
- 25**  $\Delta ABC$  is a right angled triangle. Identify the value of  $\sin^2 A + \sin^2 B + \sin^2 C$ .
- (A) 2                                      (B) 1  
(C) 0                                      (D) -1

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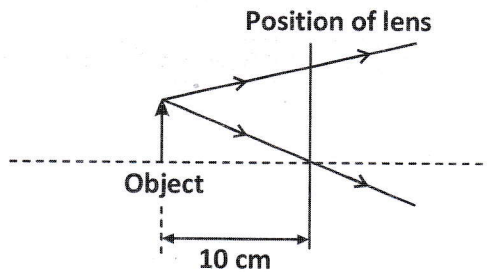
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- 26 Materials can be classed, in electrical terms, as either conductors or insulators. Which two materials are correctly classified ?

|   | Conductor | Insulator |
|---|-----------|-----------|
| A | Aluminium | Sodium    |
| B | Copper    | Plastic   |
| C | Glass     | Wood      |
| D | Rubber    | Steel     |

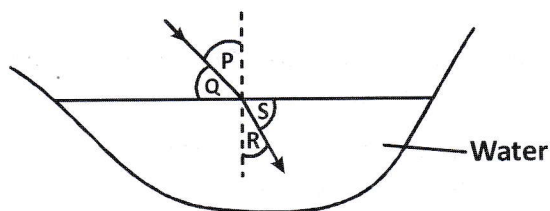
- 27 The diagram given below shows the paths of two rays of light from an object. The object is 10 cm in front of the lens in the position shown.



Which type of lens is it and what is its focal length ?

|   | Lens       | Focal Length       |
|---|------------|--------------------|
| A | Converging | Greater than 10 cm |
| B | Converging | Less than 10 cm    |
| C | Diverging  | Greater than 10 cm |
| D | Diverging  | Less than 10 cm    |

- 28** A man's near point is 0.5 m and far point is 3 m. Power of spectacle lenses required for (i) reading purposes, (ii) seeing distant objects, respectively, are
- (A) - 2 D and + 3 D  
 (B) + 2 D and - 3 D  
 (C) + 2 D and - 0.33 D  
 (D) - 2 D and + 0.33 D
- 29** The diagram given below shows the path of a ray of light travelling towards and into a pool of water. Four angles are labelled as P, Q, R and S respectively.



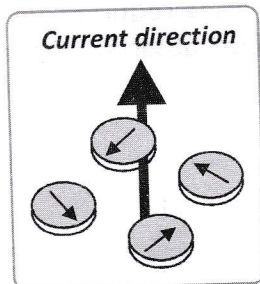
Which two angles are correctly used in the equation

$$\frac{\sin i}{\sin r} = \text{constant} ?$$

- (A) P and R                      (B) P and S  
 (C) Q and R                      (D) Q and S

Space for rough work

- 30 Observe the figure given below.



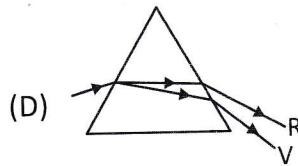
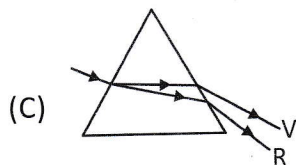
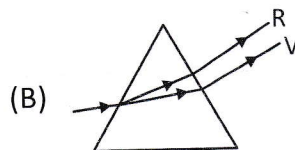
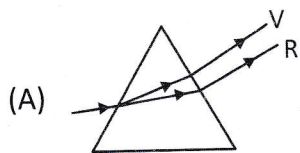
What happens when current flowing in a straight wire is surrounded by four compasses ?

- (A) Compass needles are affected by the material of the wire.
- (B) Compass needles are affected by the circular electric field in the wire.
- (C) Compass needles are affected by the circular magnetic field produced by the current in the wire.
- (D) Both (A) and (B)
- 31 The power of a lens, a short sighted person uses is  $-2$  dioptre. Find the maximum distance of an object which he can see without spectacle ?
- (A) 25 cm                      (B) 50 cm
- (C) 100 cm                      (D) 10 cm
- 32 A concave mirror of focal length 10 cm is kept in front of an object at a distance of 50 cm from it. If the object is 1.0 cm high, what will be the size of the image ?
- (A) 0.59 cm                      (B) 0.47 cm
- (C) 0.38 cm                      (D) 0.25 cm

**33** A straight wire of diameter 0.5 mm carrying a current of 1 A is replaced by another wire of 1 mm diameter carrying the same current. The strength of magnetic field far away is

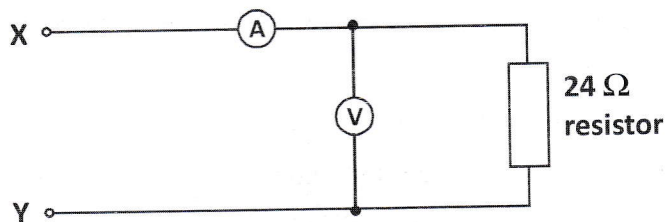
- (A) twice the earlier value.
- (B) half of the earlier value.
- (C) quarter of its earlier value.
- (D) same as the earlier value.

**34** When a narrow beam of white light passes through a prism, it produces a spectrum. Which diagram correctly shows the refraction and dispersion produced by the prism ?



Space for rough work

- 35 The diagram given below shows an electric circuit.



Which pair of readings is obtained when a suitable power supply is connected between X and Y ?

|   | Voltmeter Readings | Ammeter Readings |
|---|--------------------|------------------|
| A | 2 V                | 6 A              |
| B | 2 V                | 0.5 A            |
| C | 12 V               | 0.5 A            |
| D | 12 V               | 2 V              |

Space for rough work

- 36** In aluminothermic process, aluminium acts as a/an  
(A) oxidising agent (B) reducing agent  
(C) dehydrating agent (D) all of the above
- 37** Solid calcium oxide reacts vigorously with water to form calcium hydroxide and this process is called Slaking of lime. Calcium hydroxide dissolves in water to form a solution called Lime water as  
(i) it is an endothermic reaction.  
(ii) it is an exothermic reaction.  
(iii) pH of the resulting solution will be more than seven.  
(iv) pH of the resulting solution will be less than seven.  
Which among the given statements are true about Slaking of lime and the solution formed ?  
(A) (i) and (ii) only (B) (ii) and (iii) only  
(C) (i) and (iv) only (D) (iii) and (iv) only
- 38** Which set contains all the possible complete combustion and incomplete combustion products of methane ?  
(A) Carbon dioxide, water, carbon, carbon monoxide.  
(B) Carbon, carbon monoxide and hydrogen  
(C) Carbon dioxide, carbon monoxide, hydrogen and water  
(D) Carbon monoxide and water

**39** Universal indicator shows yellow colour when added to a solution at 25°C. If its concentration is changed such that the same indicator shows red colour. Identify a correct statement.

- (A) The solution is diluted to 100 times
- (B) The solution is concentrated by 100 times
- (C) The solution is concentrated 10,000 times
- (D) The solution is concentrated 1,00,000 times

**40** Identify a false statement.

- (A) Gold and platinum are inert metals, so they exist in nature in their native state.
- (B) Metals high in reactivity series are obtained by roasting and refining of the ore.
- (C) In the conversion of copper oxide into copper metal, copper sulphide acts as a reductant.
- (D) A mixture of iron oxide and aluminium is called thermite mixture and is used for joining railway tracks or cracked machine parts.

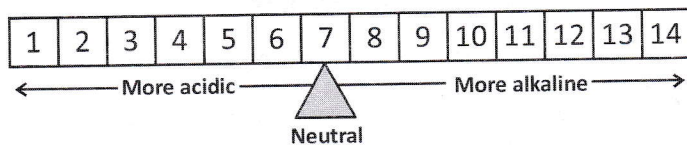
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Space for rough work

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- 41 Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper.

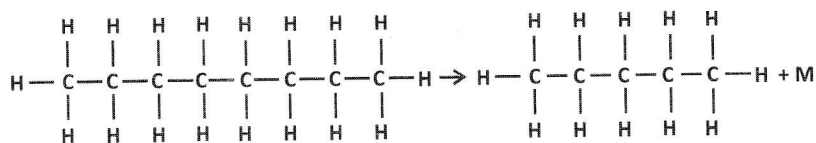


What would be the colour of pH paper ?

- (A) Red (B) Yellow  
(C) Green (D) Blue
- 42 Identify a balanced equation for the reaction given below.

Aluminium + Iron (III) oxide  $\rightarrow$  Aluminium oxide + Iron

- (A)  $2Al(s) + Fe_2O_3(s) \rightarrow Al_2O_3(s) + 2Fe(l)$   
 (B)  $2Al(s) + Fe_2O_3(s) \rightarrow Al_2O_3(s) + 2Fe(g)$   
 (C)  $Al(s) + Fe_2O_3(s) \rightarrow Al_2O_3(g) + 2Fe(s)$   
 (D)  $2Al(s) + Fe_2O_3(s) \rightarrow Al_2O_3(s) + Fe(s)$
- 43 The equation shows a molecule of an alkane being broken up into smaller molecules by heating to high temperature.



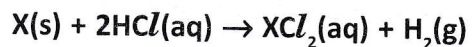
What is the other product M ?

- (A)  $C_3H_8$  (B)  $C_5H_{10}$   
(C)  $C_3H_6$  (D)  $C_5H_{12}$

44 Sodium carbonate is a basic salt of a

- (A) strong acid and a strong base
- (B) weak acid and a weak base
- (C) strong acid and a weak base
- (D) weak acid and a strong base

45 The equation given below shows the reaction between element X and dilute hydrochloric acid.



Which types of bonding are present in element X and in compound  $XCl_2$  ?

| Type of bonding |              |                     |
|-----------------|--------------|---------------------|
|                 | In element X | In compound $XCl_2$ |
| A               | Covalent     | Covalent            |
| B               | Covalent     | Ionic               |
| C               | Metallic     | Covalent            |
| D               | Metallic     | Ionic               |

Space for rough work

**46** Which of the following organs in the human digestive system are correctly matched ?

- (i) Small intestine - Absorbs nutrients from digested food.
- (ii) Appendix - Has no specific function in the body.
- (iii) Rectum - Temporary storage of faeces, before being expelled out of the body.

- (A) (i) and (ii) only      (B) (ii) and (iii) only
- (C) (iii) and (i) only      (D) (i), (ii), and (iii)

**47** X is an outer region of kidney present at the convex side. It has a dotted appearance due to the presence of Y. Identify X and Y based on the given information.

- (A) X - Renal Cortex, Y - Malpighian corpuscles
- (B) X - Renal Medulla, Y - Bowman's capsule
- (C) X - Renal Pelvis, Y - Convolted tubule
- (D) X - Renal Cortex, Y - Renal pyramids

**48** Which group of organisms together do not constitute a complete food chain ?

- (i) Grass, Lion, Rabbit, Wolf
- (ii) Phytoplankton, Man, Hawk
- (iii) Wolf, Grass, Snake, Tiger
- (iv) Frog, Snake, Eagle, Grass, Grasshopper

- (A) (i) and (iii) only      (B) (iii) and (iv) only
- (C) (ii) and (iii) only      (D) (i) and (iv)

49 Which among the following are not the functions of testes at puberty ?

- (i) Formation of germ cells
- (ii) Secretion of testosterone
- (iii) Development of placenta
- (iv) Secretion of estrogen

- (A) (i) and (ii) only      (B) (ii) and (iii) only  
 (C) (iii) and (iv) only      (D) (i) and (iv) only

50 Which is not a vestigial organ in man ?

- (A) Tail vertebrae
- (B) Nails
- (C) Nictitating membrane
- (D) Vermiform appendix

51 Match the columns.

|     | Column I       |       | Column II                          |
|-----|----------------|-------|------------------------------------|
| (P) | Blood Group A  | (i)   | Antigens A and B but no antibodies |
| (Q) | Blood Group B  | (ii)  | No antigens but antibodies A and B |
| (R) | Blood Group AB | (iii) | Antigen B and antibodies Anti-A    |
| (S) | Blood Group O  | (iv)  | Antigen A and antibodies Anti-B    |

- (A) P-(iii); Q-(iv); R-(i); S-(ii)
- (B) P-(iii); Q-(iv); R-(ii); S-(i)
- (C) P-(iv); Q-(iii); R-(i); S-(ii)
- (D) P-(iv); Q-(iii); R-(ii); S-(i)

**52** Colour blindness in humans is caused due to

- (A) Incomplete dominance
- (B) Sex linked inheritance
- (C) Law of independent assortment
- (D) Induced mutations

**53** X is present in the mid part of the brain. The X analyzes visual inputs from the eye as well as perform functions related to memory and initiation and control of behaviour. Identify X.

- (A) Cerebrum
- (B) Cerebellum
- (C) Optic lobes
- (D) Medulla oblongata

**54** Which one of the following has minimum pH ?

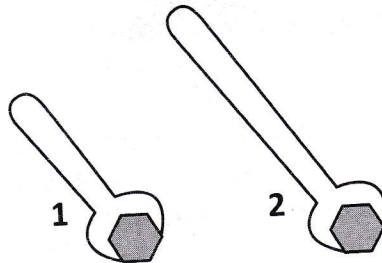
- (A) Saliva
- (B) Bile
- (C) Gastric Juice
- (D) Pancreatic juice

**55** X is a double layered membrane, and it is enclosed by the lungs. Identify X.

- (A) Pleura
- (B) Bronchi
- (C) Pericardium
- (D) All of the above

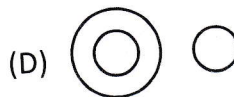
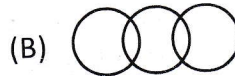
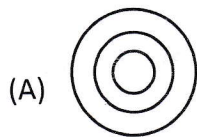
Space for rough work

**56** Which of the below wrenches will make it easier to tighten a bolt ?



- (A) 1  
(B) Both (1) and (2)  
(C) 2  
(D) There is no difference

**57** Which one of the following Venn diagrams best illustrates the three classes Rhombus, Quadrilaterals, Polygons ?



Space for rough work

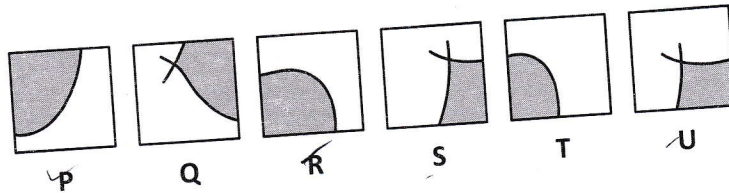
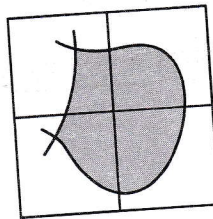
58

A four member team from Rang Sandesh is painting Mr. Ghosla's house. Mahesh is painting the front of the house. Ramesh is in the alley behind the house painting the back. Suresh is painting the window frames on the north side, Kamlesh is on the south. If Mahesh switches places with Suresh and then Suresh switches place with Kamlesh, where is Kamlesh ?

- (A) In the alley behind the house.
- (B) On the north side of the house.
- (C) In front of the house.
- (D) On the south side of the house.

59

The completed shape can be made using which 4 tiles, without turning them in any direction. Select the tiles that have been used to create the shape.



- (A) QUPT
- (C) SQPR

- (B) TRPQ
- (D) TPUS

Space for rough work

- 60** Given below is a question followed by two statements I and II. Choose the option necessary to answer the question.

Did Savrav buy a new car ?

**Statement I :** Savrav was seen test driving a car at the dealership.

**Statement II :** Savrav recently received a bonus at work.

- (A) Statement I alone is sufficient while Statement II alone is not sufficient.
- (B) Statement II alone is sufficient while Statement I alone is not sufficient
- (C) Either Statement I or Statement II is sufficient
- (D) Neither Statement I nor Statement II is sufficient

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Space for rough work

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