

## 13 AUGUST (9 AM) (SOLUTION)

1. (2) As,  $12 \times \left(\frac{12}{2} - 1\right) = 60$

Similarly,  $16 \times \left(\frac{16}{2} - 1\right) = \mathbf{112}$

2. (1) Depression is a mood disorder, while Insomnia is a sleep disorder.

3. (4) As,  $(15 - 4) \times 4 = 44$

And,  $(21 - 6) \times 4 = 60$

Similarly,  $(\mathbf{24} - 7) \times 4 = 68$

4. (3)

5. (3)

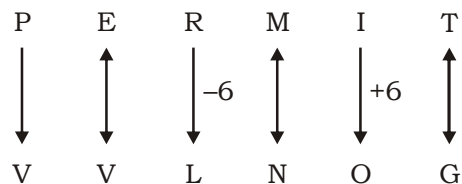
6. (4)

7. (1)

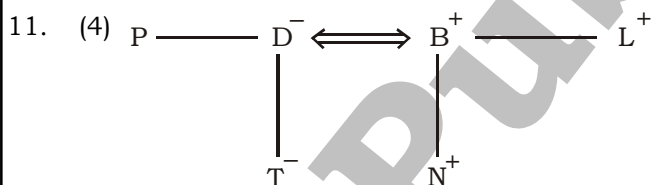
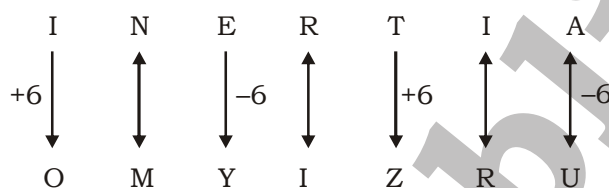
8. (1)

9. (4)

10. (3) As,



Similarly,



Hence, N is the brother of T.

12. (2) Except weight, others are skills of a person.

13. (1) 
$$\begin{array}{cccccc} 24 & 35 & 51 & 73 & 102 & 139 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\ +11 & +16 & +22 & +29 & +37 & \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \\ +5 & +6 & +7 & +8 & & \end{array}$$

14. (4) Let the total number of players be  $3x$

Hostel X =  $3x \times \frac{1}{3} = x$

Hostel Y =  $2x$

Now, Hostel X =  $x + 20$

Hostel Y =  $2x - 20$

ATQ,

$(x + 20) = 3x \times \frac{50}{100}$

$$x + 20 = \frac{3x}{2}$$

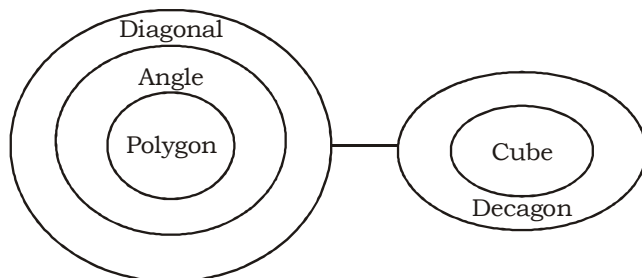
$$2x + 40 = 3x$$

$$x = 40$$

$$\therefore \text{Required \%} = \left( \frac{20}{120} \times 100 \right) \% = 16.67\%$$

15. (3) Except, 17 : 307, second number is divisible by first number.

16. (4)

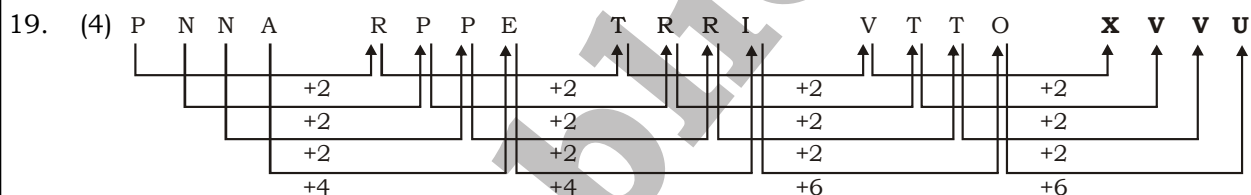


I. True II. False III. True IV. False

Hence, both conclusions I and III follow.

17. (4) The voice of horse is heigh, while the voice of ducks is quack.

18. (1) LNUAPZ/LNUAPZ/LNUAPZ



20. (2) As,  $25 \times \frac{18}{2} = 225$

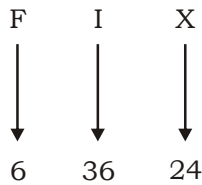
Similarly,  $24 \times \frac{22}{2} = 264$

21. (1) As,

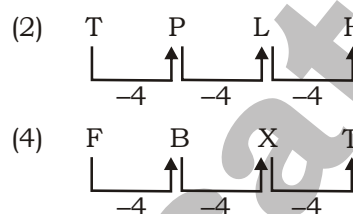
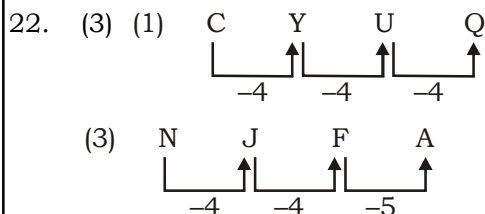
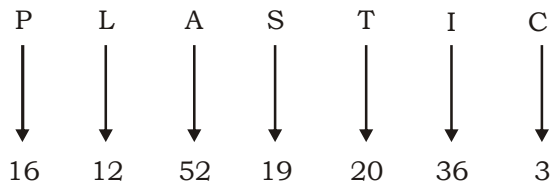
|            |            |            |            |            |
|------------|------------|------------|------------|------------|
| A          | E          | I          | O          | U          |
| ↑          | ↑          | ↑          | ↑          | ↑          |
| ↓          | ↓          | ↓          | ↓          | ↓          |
| Z          | V          | R          | L          | F          |
| 26         | 22         | 18         | 12         | 6          |
| $\times 2$ | $\times 2$ | $\times 2$ | $\times 2$ | $\times 2$ |
| 52         | 44         | 36         | 24         | 12         |

And,

|    |    |    |    |    |   |
|----|----|----|----|----|---|
| A  | R  | O  | U  | N  | D |
| ↓  | ↓  | ↓  | ↓  | ↓  | ↓ |
| 52 | 18 | 24 | 12 | 14 | 4 |



Similarly,



23. (3)  $42 * 7 * 64 * 11 * 6 * 4$   
 Put the signs,  
 $42 \div 7 + 64 - 11 \times 6 = 4$   
 $6 + 64 - 66 = 4$   
 $70 - 66 = 4$   
 $4 = 4$

24. (2)

25. (1) 5. Fraud → 2. Freedom → 1. Freeze → 6. Fringe → 4. Frozen → 3. Fryer

26. (3) Electron volt, unit of energy commonly used in atomic and nuclear physics, equal to the energy gained by an electron (a charged particle carrying unit electronic charge) when the electrical potential at the electron increases by one volt.

28. (3) The public network will be set up by the public data office aggregators (PDOAs) to provide Wi-Fi service through the public data offices (PDOs) spread throughout the country. It will help accelerate the proliferation of broadband internet services through a public Wi-Fi network.

29. (2) The structural and functional units of kidneys are nephrons. A nephron consists of two parts mainly - renal tubule and renal corpuscle

31. (1) Natural convection, or free convection, occurs due to temperature differences which affect the density, and thus relative buoyancy, of the fluid. Heavier (denser) components will fall, while lighter (less dense) components rise, leading to bulk fluid movement.

33. (4) The Toyota Thailand Open was a badminton tournament that took place at the Impact Arena in Thailand from 19 to 24 January 2021.

34. (4) The Union Ministry of Home Affairs has declared entire Nagaland as a "disturbed area" for six more months till December 31 this year, under the Armed Forces (Special Powers) Act (AFSPA) that empowers security forces to conduct operations anywhere and arrest anyone without prior notice.

36. (4) The Baghmara Pitcher Plant Sanctuary(BPPS) is the only Sanctuary in Meghalaya where in-situ conservation of Pitcher Plant is being carried out.

37. (1) Setting up of 15 Health Emergency Operation Centers and 2 mobile hospitals; and. Setting up of a national institution for One Health, a Regional Research Platform for WHO South East Asia Region, 9 Bio-Safety Level III laboratories and 4 regional National Institutes for Virology

38. (1) This Gurdwara, on the banks of the Sutlej, is situated near the railway tracks and is the place where many Sikhs take the ashes of their deceased to be immersed in the river.

39. (1) Planning Commission, agency of the government of India established in 1950 to oversee the country's economic and social development, chiefly through the formulation of five-year plans.
40. (4) The second Round Table Conference was held in London from 7 September 1931 to 1 December 1931 with the participation of Gandhi and the Indian National Congress. Two weeks before the Conference convened, the Labour government had been replaced by the Conservatives.
43. (1) Impulse has the same dimension as that of linear momentum .
44. (4) In Leh, the first-ever ice climbing festival which was celebrated in Nubra valley concluded on 11 January 2021.
47. (3) Journalist-author Raj Kamal Jha has won the 3rd Rabindranath Tagore Literary Prize for his novel, "The City and The Sea". Jha's book, which is based on the December 2012 Nirbhaya rape and murder case, was chosen from ten shortlisted books.
48. (2) Unique Transaction Reference (UTR) number is a 22 character code used to uniquely identify a transaction in RTGS system.
49. (2) Charan Singh replaced Morarji Desai as the Prime Minister of India in 1979.
51. (3) Required ratio =  $(600 + 580 + 620) : (628 + 722) = 1800 : 1350 = 4 : 3$
52. (4) A alone can finish the work in 24 days A's 1 days work =  $\frac{1}{24}$

A and B complete the whole work in  $\frac{34}{3}$  days

A and B work on alternate days, with B beginning so, we can say B will work only 6 days

and A will work only =  $\frac{34}{3} - 6 = \frac{16}{3}$  days

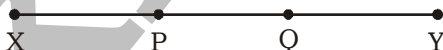
If A's 1 day work =  $\frac{1}{24}$  of work A complete in 1 day

A's  $\frac{16}{3}$  days work =  $\frac{1}{24} \times \frac{16}{3} = \frac{2}{9}$

Remaining work =  $1 - \frac{2}{9} = \frac{7}{9}$

$\therefore$  B completes the  $\frac{7}{9}$  work in 6 days

53. (2)  $20 \div 5$  of  $8 \times [9 \div 6 \times (6 - 3)] - (10 \div 2$  of  $20)$   
 $= 20 \div 40 \times [9 \div 6 \times 3] \div (10 \div 40)$   
 $= \frac{1}{2} \times \left[ \frac{9}{6} \times 3 \right] - \frac{1}{4} = \frac{1}{2} \times \frac{9}{2} - \frac{1}{4}$   
 $= \frac{9}{4} - \frac{1}{4} = \frac{8}{4} = 2$

54. (3) 

Let the distance between X and Y 3 km.

Now,  $XP = PQ = QY = 1$  km

Ratio of time taken to go X to Q and from Y to Q = 4 : 5

Now, ratio of time taken to go X to P and Y to Q = 2 : 5

So, ratio of speed of downstream and upstream = 5 : 2

Speed of current =  $\frac{5 - 2}{2} = \frac{3}{2}$

Ratio of speed of boat in downstream to speed of river current =  $5 : \frac{3}{2} = 10 : 3$

55. (4)  $P = ₹ 8192$

$$T = \frac{5}{4} \text{ years} = 15 \text{ months}$$

$$R = 15\%$$

If the interest is compounded 5 monthly, then

$$\text{Time} = \frac{15}{5} = 3$$

$$\text{Rate} = \frac{15}{12} \times 5 = \frac{75}{12} \%$$

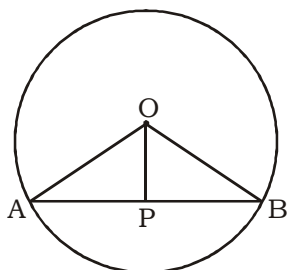
$$\therefore \text{CI} = 8192 \left( 1 + \frac{75}{12 \times 100} \right)^3 - 8192$$

$$= 8192 \left( 1 + \frac{1}{16} \right)^3 - 8192$$

$$= 8192 \times \frac{17}{16} \times \frac{17}{16} \times \frac{17}{16} - 8192$$

$$= 9826 - 8192 = ₹ 1634$$

56. (1)



$$\text{Diameter} = 25 \text{ cm}$$

$$\text{Radius OA} = \frac{25}{2} \text{ cm}$$

$$AB = 21 \text{ cm}$$

$$AP = \frac{21}{2} \text{ cm}$$

In  $\triangle AOP$ ,

$$OP = \sqrt{\left( \frac{25}{2} \right)^2 - \left( \frac{21}{2} \right)^2} = \sqrt{\frac{625}{4} - \frac{441}{4}}$$

$$= \sqrt{\frac{184}{4}} = \sqrt{46} \text{ cm}$$

57. (4) Required ratio =  $(1650 + 1075 + 1280 + 1170 + 690) : (2375 + 2651 + 1520 + 1085 + 859)$   
 $= 5865 : 8490 = 391 : 566$

58. (4)  $\frac{\cos^2 \theta}{\cot^2 \theta + \sin^2 \theta - 1} = 3$

$$\cos^2 \theta = 3 \cot^2 \theta + 3 \sin^2 \theta - 3$$

$$\cos^2 \theta = 3 \cot^2 \theta + 3(1 - \cos^2 \theta) - 3$$

$$\cos^2 \theta = 3 \cot^2 \theta + 3 - 3 \cos^2 \theta - 3$$

$$3 \cot^2 \theta = 4 \cos^2 \theta$$

$$\frac{\cos^2 \theta}{\cot^2 \theta} = \frac{3}{4}$$

$$\sin^2 \theta = \frac{3}{4}$$

$$\sin \theta = \frac{\sqrt{3}}{2}$$

$$\theta = 60^\circ$$

$$\tan 60^\circ + \operatorname{cosec} 60^\circ = \sqrt{3} + \frac{2}{\sqrt{3}} = \frac{3+2}{\sqrt{3}}$$

$$= \frac{5}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = \frac{5\sqrt{3}}{3}$$

59. (3) ATQ,

$$\frac{19-x}{28-x} = \frac{55-x}{91-x}$$

$$1729 - 19x - 91x + x^2 = 1540 - 28x - 55x + x^2$$

$$1729 - 110x = 1540 - 83x$$

$$27x = 189$$

$$x = \frac{189}{27} = 7$$

60. (4) Let the CP of book = ₹ 100

$$SP = 100 \times \frac{121}{100} = ₹ 121$$

∴ Required ratio = 100 : 121

61. (3)  $8(x+y)^3 - 27(x-y)^3 = (5y-x)(Ax^2 + By^2 + Cxy)$

$$[2(x+y)^3 - 3(x-y)^3] = (5y-x)(Ax^2 + By^2 + Cxy)$$

$$[2(x+y) - 3(x-y)][4(x+y)^2 + 9(x-y)^2 + 6(x+y)(x-y)] = (5y-x)(Ax^2 + By^2 + Cxy)$$

$$(2x+2y-3x+3y)(4x^2+4y^2+8xy+9x^2+9y^2-18xy+6x^2-6y^2) = (5y-x)(Ax^2 + By^2 + Cxy)$$

$$(5y-x)(19x^2+7y^2+10xy) = (5y-x)(Ax^2 + By^2 + Cxy)$$

$$Ax^2 + By^2 + Cxy = 19x^2 + 7y^2 + 10xy$$

$$\text{Now, } A = 19, B = 7 \text{ and } C = 10$$

$$\therefore A + B + C = 19 + 7 + 10 = 36$$

62. (4) In the year 2016 =  $\left(\frac{1290}{1400} \times 100\right)\% = 92.14\%$

$$\text{In the year 2018} = \left(\frac{1450}{1500} \times 100\right)\% = 96.66\%$$

63. (4)  $x + \frac{1}{x} = 4$

Squaring both sides,

$$x^2 + \frac{1}{x^2} = 14 \quad \dots\dots(i)$$

Cubing both sides,

$$x^3 + \frac{1}{x^3} + 3 \times x \times \frac{1}{x} \left(x + \frac{1}{x}\right) = 64$$

$$x^3 + \frac{1}{x^3} + 3 \times 4 = 64$$

$$x^3 + \frac{1}{x^3} = 52 \quad \dots(ii)$$

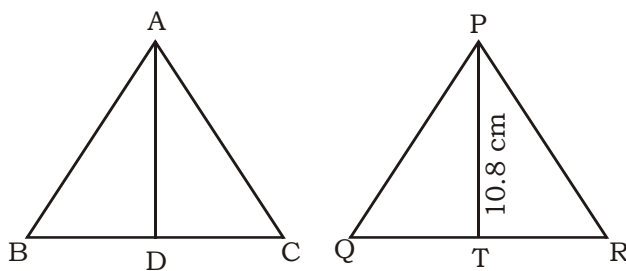
Multiplying (i) and (ii),

$$\left(x^2 + \frac{1}{x^2}\right)\left(x^3 + \frac{1}{x^3}\right) = 14 \times 52$$

$$x^5 + \frac{1}{x^5} + 4 = 728$$

$$\therefore x^5 + \frac{1}{x^5} = 724$$

64. (4)



$$\text{Area of } \triangle ABC = 64 \text{ cm}^2$$

$$\text{Area of } \triangle PQR = 81 \text{ cm}^2$$

$$\text{Given, } \text{Ar.}(\triangle ABC) \sim \text{Ar.}(\triangle PQR)$$

$$\text{Now, } \frac{\text{Ar.}(\triangle ABC)}{\text{Ar.}(\triangle PQR)} = \left(\frac{AD}{PT}\right)^2 \quad [\text{The ratio of the area of two similar triangles is equal to the square of the ratio of any pair of corresponding sides of the similar triangle}]$$

$$\frac{64}{81} = \left(\frac{AD}{10.8}\right)^2$$

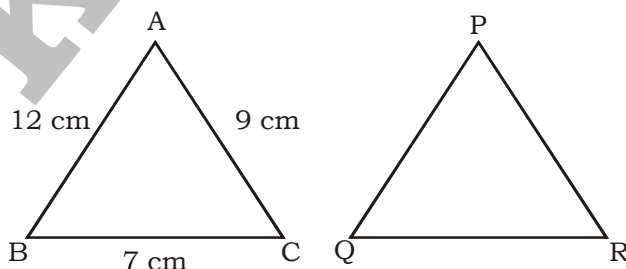
$$\frac{70}{10.8} = \frac{8}{9}$$

$$AD = \frac{10.8 \times 8}{9} = 9.6 \text{ cm}$$

65. (2) Total of 28 numbers =  $77 \times 28 = 2156$   
 Total of first 14 numbers =  $14 \times 74 = 1036$   
 Total of last 15 numbers =  $15 \times 84 = 1260$   
 14<sup>th</sup> number =  $(1036 + 1260) - 2156 = 140$

$$\therefore \text{Required average} = \frac{2156 - 140}{27} = \frac{2016}{27} = 74.7$$

66. (2)



$$\text{Given : } \triangle ABC \sim \triangle PQR$$

$$\frac{\text{Ar.}(\triangle ABC)}{\text{Ar.}(\triangle QPR)} = \frac{144}{49}$$

Now,

$\frac{\text{Ar.}(\triangle ABC)}{\text{Ar.}(\triangle QPR)} = \left(\frac{AC}{PR}\right)^2$  [The ratio of the area of two similar triangles is equal to the square of the ratio of any pair of corresponding sides of the similar triangles]

$$\frac{144}{49} = \left(\frac{9}{PR}\right)^2$$

$$\frac{9}{PR} = \frac{12}{7}$$

$$PR = \frac{9 \times 7}{12} = \frac{21}{4} \text{ cm}$$

67. (1) Percentage increased in June 2018 over its previous months =  $\left(\frac{780 - 600}{600} \times 100\right)\% = 30\%$

$\therefore$  Required number of cars sold by D in July 2018 =  $780 \times \frac{130}{100} = 1014$

68. (2) Total cost price of 1 fruit =  $\left(\frac{140}{15} + \frac{120}{10}\right) \div 2 = ₹ \frac{64}{3 \times 2} = ₹ \frac{32}{3}$

Selling price of 1 fruit =  $\frac{132}{12} = ₹ 11$

Profit =  $11 - \frac{32}{3} = ₹ \frac{1}{3}$

$\therefore$  Profit% =  $\left(\frac{1}{3} \times \frac{3}{32} \times 100\right)\% = 3\frac{1}{8}\%$

69. (2)  $\angle ADC = 78^\circ$  and  $\angle BEC = 52^\circ$

As we know, in a cyclic quadrilateral, the sum of opposite angles are  $180^\circ$ .

$$\angle ADC + \angle ABC = 108^\circ$$

$$\angle ABC = 180^\circ - 78^\circ = 102^\circ$$

$$\angle ABC = \angle CBE = 180^\circ \Delta [\text{Straight line}]$$

$$\angle CBE = 180^\circ - 102^\circ = 78^\circ$$

In  $\triangle BEC$ ,

$$\angle CBE + \angle BEC + \angle ECB = 180^\circ$$

$$\angle ECB + \angle BCD = 180^\circ \quad (\text{Straight line})$$

$$\angle BCD = 180^\circ - 50^\circ = 130^\circ$$

$$\angle BAD + \angle BCD = 180^\circ$$

$$\angle BAD = 180^\circ - 130^\circ = 50^\circ$$

In  $\triangle AFB$ ,

$$\angle BAF + \angle ABF + \angle AFB = 180^\circ$$

$$\angle AFB = 180^\circ - 50^\circ - 102^\circ = 28^\circ$$

70. (4)  $x + y = 4$

$$\frac{1}{x} + \frac{1}{y} = \frac{16}{15}$$

$$\frac{x+y}{xy} = \frac{16}{15}$$

$$\frac{4}{xy} = \frac{16}{15}$$

$$xy = \frac{60}{16} = \frac{15}{4}$$

$$\therefore x^3 + y^3 = (x + y)^3 - 3xy(x + y)$$

$$= 4^3 - 3 \times \frac{15}{4} (4) = 64 - 45 = 19$$

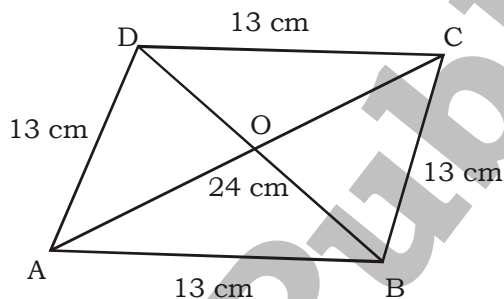
71. (1)  $\frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta - 1} + \frac{\operatorname{cosec} \theta}{\operatorname{cosec} \theta + 1} - \tan^2 \theta$

$$= \frac{\cos ec^2 \theta + \cos ec \theta + \cos ec^2 \theta - \cos ec \theta}{\cos ec^2 \theta - 1} - \tan^2 \theta$$

$$= \frac{2 \cos ec^2 \theta}{\cot^2 \theta} - \frac{1}{\cot^2 \theta} = \frac{2 \cos ec^2 \theta - 1}{\cot^2 \theta}$$

$$= \frac{\cos ec^2 \theta + \cot^2 \theta}{\cot^2 \theta} = \sec^2 \theta + 1$$

72. (4)



AC = 24 cm

AO = 12 cm (Diagonals of rhombus bisect each other)

In  $\triangle AOD$ ,

$$OD = \sqrt{AD^2 - AO^2} = \sqrt{13^2 - 12^2}$$

$$= \sqrt{169 - 144} = 5 \text{ cm}$$

$$BD = OD \times 2 = 5 \times 2 = 10 \text{ cm}$$

$$\therefore \text{Area of rhombus} = \frac{1}{2} \times d_1 \times d_2 = \frac{1}{2} \times 24 \times 10 = 120 \text{ cm}^2$$

73. (2) Let the income of B = ₹ 100

$$\text{Income of A} = 100 \times \frac{145}{100} = ₹ 145$$

$$\text{Income of C} = (100 + 145) \times \frac{40}{100} = ₹ 98$$

$$\text{Income of D} = 98 \times \frac{120}{100} = ₹ 117.6$$

$$\therefore \text{Income of C} = \frac{13200}{17.6} \times 98 = ₹ 73500$$

74. (3)  $\cot 25^\circ \cot 35^\circ \cot 45^\circ \cot 55^\circ \cot 65^\circ$   
 $= \cot (90^\circ - 65^\circ) \cot (90^\circ - 55^\circ) \cot 45^\circ \cot 55^\circ \cot 65^\circ$   
 $= \tan 65^\circ \cdot \cot 65^\circ \tan 55^\circ \cdot \cot 55^\circ \cot 45^\circ$   
 $= 1 \times 1 \times 1 = 1$

75. (4)  $N = 676xy$  is divisible by 11  
 So,  $x + 7 - (6 + 6 + y) = x - y - 5 = 0$  or 11  
 So,  $x = y + 5$  or  $x = y + 16$   
 $x = y + 16$  is not possible  
 Taking,  $x = y + 5$  .....(i)  
 $N$  is divisible by 3  
 So,  $6 + 7 + 6 + x + y = 19 + x + y$  is multiple of 3  
 Or,  $19 + y + 5 + y = 3k$   
 $24 + 2y = 3k$   
 So,  $y = 0, 3, 6$  .....  
 $676xy$  is divisible by 7  
 And  $\frac{67600}{7} = 9657.14$   
 And  $9658 \times 7 = 67606$   
 And  $9669 \times 7 = 67683$   
 Here  $x = 8$  and  $y = 3$   
 So,  $y = x + 5$  is true  
 Hence, 67683 is divisible by 3, 7 and 11  
 Thus,  $3x - 5y = 3 \times 8 - 5 \times 3 = 24 - 15 = 9$

## MEANINGS IN ALPHABETICAL ORDER

| <b>Words</b> | <b>Meaning in English</b>                                                                                    | <b>Meaning in Hindi</b> |
|--------------|--------------------------------------------------------------------------------------------------------------|-------------------------|
| Abrupt       | sudden and unexpected                                                                                        | आकस्मिक                 |
| Accomplish   | achieve or complete successfully                                                                             | समाप्त करना             |
| Achieve      | successfully bring about or reach<br>(a desired objective, level, or result) by effort,<br>skill, or courage | प्राप्त करना            |
| Exterminated | after exterminating the entire population,<br>the soldiers set fire to the buildings                         | नष्ट करना               |
| Gradual      | taking place or progressing slowly or by degrees                                                             | क्रमिक                  |
| Procure      | obtain (something), especially with care or effort                                                           | खरीद                    |
| Regime       | a government, especially an authoritarian one                                                                | शासन                    |
| Seize        | take hold of suddenly and forcibly                                                                           | जब्त करना               |
| Snatch       | quickly seize (something) in a rude or eager way                                                             | छीनना                   |
| Territory    | an area of land under the jurisdiction of a ruler                                                            | क्षेत्र                 |
| Unmanageable | difficult or impossible to manage, manipulate                                                                | अप्रबंधनीय              |

## 13 AUGUST (9 AM) (ANSWER KEY)

|         |         |         |          |
|---------|---------|---------|----------|
| 1. (2)  | 26. (3) | 51. (2) | 76. (3)  |
| 2. (1)  | 27. (2) | 52. (4) | 77. (4)  |
| 3. (4)  | 28. (3) | 53. (2) | 78. (4)  |
| 4. (3)  | 29. (2) | 54. (3) | 79. (2)  |
| 5. (3)  | 30. (4) | 55. (4) | 80. (2)  |
| 6. (4)  | 31. (1) | 56. (1) | 81. (2)  |
| 7. (1)  | 32. (3) | 57. (4) | 82. (3)  |
| 8. (1)  | 33. (4) | 58. (4) | 83. (3)  |
| 9. (4)  | 34. (4) | 59. (3) | 84. (1)  |
| 10. (3) | 35. (3) | 60. (4) | 85. (4)  |
| 11. (4) | 36. (4) | 61. (4) | 86. (1)  |
| 12. (2) | 37. (1) | 62. (4) | 87. (2)  |
| 13. (1) | 38. (1) | 63. (4) | 88. (2)  |
| 14. (4) | 39. (1) | 64. (4) | 89. (1)  |
| 15. (3) | 40. (4) | 65. (2) | 90. (1)  |
| 16. (4) | 41. (4) | 66. (2) | 91. (4)  |
| 17. (4) | 42. (1) | 67. (1) | 92. (1)  |
| 18. (1) | 43. (1) | 68. (2) | 93. (1)  |
| 19. (4) | 44. (4) | 69. (2) | 94. (3)  |
| 20. (2) | 45. (1) | 70. (4) | 95. (2)  |
| 21. (1) | 46. (4) | 71. (1) | 96. (2)  |
| 22. (3) | 47. (3) | 72. (4) | 97. (2)  |
| 23. (3) | 48. (2) | 73. (2) | 98. (2)  |
| 24. (2) | 49. (2) | 74. (3) | 99. (4)  |
| 25. (1) | 50. (3) | 75. (4) | 100. (4) |

77. (4) The correct spelling of Pieceful is Peaceful.
83. (3) Replace 'will have' by 'would have', as this is an example of Conditional sentences.
85. (4) No substitution
86. (1) No substitution
94. (3) 'Quiet' is not appropriate here. 'Quiet' means 'silence'. Use 'quite' instead which means 'completely'.
95. (2) The correct spelling of Voilence is Violence.