UP SI MOCK TEST – 48 (SOLUTION)

81. (B) **Ram : Rahim**
    10 : 11

    Required percentage = $\dfrac{11 \times 100}{10}$

    = 110

82. (D) Clock gains in 24 hrs = 15min.

    Clock gains in 16 hrs = $\dfrac{15}{24} \times 16$

    = 10min.

    Time shows at 4 AM = 4:10 AM

83. (B)

A	B + C
1000	5000

    ↓

    2 : 3
    1000 2000 : 3000
    1 : 2 : 3

    ∴ Profit of C = $\dfrac{3 \times 2400}{6}$ = ₹1200

84. (D)

    From ΔADM
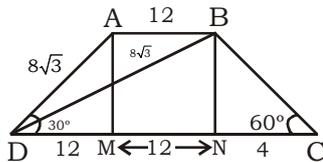
    sin 30º = $\dfrac{AM}{DA}$

    AM = $4\sqrt{3}$

    DM = $\sqrt{AD^2 - AM^2}$ = 12 cm

    From ΔDBN
    DB³ = (DN² + BN²)
    = 48 + 576 = 624
    Similarly, form ΔAMC
    AC² = AM² + MC²
    = 48 + 256 = 304
    DB² + AC² = 624 + 304 = 928

85. (B) A.T.Q.,
    15x = 3 × 10y

    ⇒ $\dfrac{x}{y}$ = $\dfrac{2}{1}$

86. (B) Area of the base of mountain = πr^2

    1.54 km² = $\dfrac{22}{7} r^2$

    ⇒ $\dfrac{1.54 \times 7}{22}$ = r^2

    ⇒ r = 0.7 km

Slant height = 2.5 km
∴ Height of the mountain

= $\sqrt{(2.5)^2 - (0.7)^2}$

= $\sqrt{6.25 - 0.49}$

= $\sqrt{5.76}$ = 2.4 km

87. (D) A.T.Q.,
    Volume of new solid sphere.

    = $\dfrac{3}{4} \pi \left(\dfrac{6}{2}\right)^3$ + $\dfrac{4}{3} \pi \dfrac{8}{2} \pi \left(\dfrac{10}{2}\right)^3$

    Or, $\dfrac{4}{3} \pi r^3$ = $\dfrac{4}{3} \pi$ [(3)³ + (4)³ + (5)³]

    Or, r^3 = 27 + 64 + 125
    Or, r^3 = 216 or, r^3 = (6)³
    Or, r = 6 cm
    ∴ Diameter of the new sphere
    = 2 × 6 = 12 cm

88. (A)
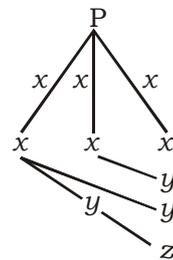
    Difference of 2 years = y = 7
    And difference of 3 years
    = 3y + z = 23
    ⇒ z = 2

    ∴ Required rate = $\dfrac{2}{7} \times 100$ = $\dfrac{200}{7}$%

89. (C) Speed of sound = $\dfrac{6640}{20}$ = 332m/sec

90. (D) Let the radius of the sphere & hemisphere = r cm
    A.T.Q.,
    $4 \pi r^2 : 3 \pi r^2$
    ⇒ 4 : 3

91. (A) Let x be price of 1st item be x
    Price of 2nd = 520 − x
    Profit and loss are same

$$\frac{x \times 16}{100} - \frac{(520 - x) \times 10}{100} = 0$$

$16x - 5200 + 10x = 0$

$26x = 5200$

$x = 200$

C.P of item at loss = 520 –200

= ₹320

$$S.P = 320 \times \frac{90}{100}$$

= ₹288

92. (C) Deepa's original speed = 30 km/hr.
Deepa's new speed = (30 + 10) km/hr
= 40 km/hr.
Distance = (30 × 6) km = 180 km.
Hema's original speed
= 45 + 5) km/hr = 50 km/hr
Difference in time

$$= \left(\frac{180}{40} - \frac{180}{50}\right) \text{ hrs} = \frac{9}{10} \text{ hrs} = \left(\frac{9}{10} \times 60\right)$$

min 54 min.

93. (A) Ist → Profit = 20% = $\frac{1}{5}$

C.P. : S.P. = 5 : 6

IInd → loss = 25% = $\frac{1}{4}$

SP. in both case are same so
Ist → C.P. : S.P. → 5 : 6
IInd → C.P. : S.P. → 8 : 6
Total C.P. = 8 + 5 = 13
Total S.P. = 6 + 6 = 12

$$\text{Loss\%} = \frac{13 - 12}{13} \times 100 = \frac{1}{13} \times 100$$

= 7.69% ≅ 7.7%

94. (A) $\dfrac{1}{1 + \dfrac{1}{1 + \dfrac{1}{1 + \dfrac{1}{x}}}} = \dfrac{5}{8}$

$$\Rightarrow \frac{1}{1 + \dfrac{1}{1 + \dfrac{x}{x+1}}} \Rightarrow \frac{1}{1 + \dfrac{x+1}{2x+1}}$$

$$\Rightarrow \frac{2x+1}{3x+2} = \frac{5}{8}$$

$\Rightarrow 16x + 8 = 15x + 10$

$x \Rightarrow 2$

95. (A) For one complete revolution, the first, second and third wheels takes

$$\frac{60}{40}, \frac{60}{24}, \frac{60}{16}$$

i.e., $\dfrac{3}{2}, \dfrac{5}{2}, \dfrac{15}{4}$ seconds respectively.

∴ Time taken for all red spots to touch the ground again simultaneously.

$$= \left(\text{L.C.M. of } \frac{3}{2}, \frac{5}{2}, \frac{15}{4}\right)$$

$$\sec = \left(\frac{\text{L.C.M. of } 3, 5, 15}{\text{H.C.F. of } 2, 2, 4}\right)$$

$$= \left(\frac{15}{2}\right) \sec = 7\frac{1}{2} \text{ seconds.}$$

96. (B) $(a + b + c)^2 = a^2 + b^2 + c^2 + 2(ab + bc + ca)$

$36 = 14 + 2(ab + bc + ca)$

$ab + bc + ca = 11$ ....(i)

$a^3 + b^3 + c^3 - 3abc = (a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$

$= 36 - 3abc = 84 - 66 = 18$

$3abc = 36 - 18 = 18$

$abc = 6$

97. (B) $x = 7 + 4\sqrt{3}$

$$\sqrt{n} = \sqrt{7 + 4\sqrt{3}}$$

$$= \sqrt{2^2 + \left(\sqrt{3}\right)^2 + 2.2\sqrt{3}}$$

$$= \sqrt{\left(2 + \sqrt{3}\right)^2}$$

$$\sqrt{n} = \left(2 + \sqrt{3}\right)$$

$$\frac{1}{\sqrt{n}} = \frac{1}{\left(2 + \sqrt{3}\right)} = \left(2 - \sqrt{3}\right)$$

Now,

$$\sqrt{n} + \frac{1}{\sqrt{n}} = 2 + \sqrt{3} + 2 - \sqrt{3} = 4$$

98. (A)
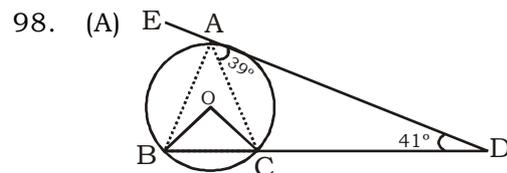
∠ACB = ∠CAD + ∠CDA [Sum of two interior angle is equal to opposite of exterior angle]

∠ACB = 39° + 41° = 80

∠BAE = ∠BCA = 80° [Alternate segment]

∠EAB + ∠BAC + ∠CAD = 180° [Linear angle]

$80° + \angle BAC + \angle CAD = 180°$

$\angle BAC = 61°$

$\therefore \angle BOC = 2 \times \angle BAC$ [Center angle is twice the angle subtended by the major arc]

$= 2 \times 61° = 122°$

99. **(B)** $\sec\theta + \tan\theta = m$

$\sec\theta - \tan\theta = 1/m$

$2\tan\theta = \dfrac{m^2 - 1}{2m}$

$\tan\theta = \dfrac{m^2 - 1}{2m} \to \dfrac{P}{B}$
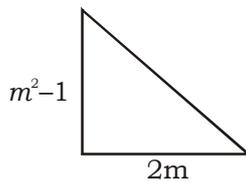
Hypotenuse $= \sqrt{m^4 + 1 - 2m^2 + 4m^2}$

$= \sqrt{m^4 + 2m^2 + 1}$

$= \sqrt{\left(m^2 + 1\right)^2} = m^2 + 1$

$\sin\theta = \dfrac{P}{H} = \dfrac{m^2 - 1}{m^2 + 1}$

100. **(C)**
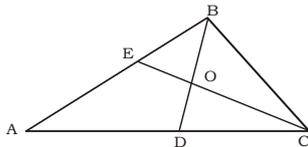
$OC : OE = 2 : 1$

ATQ,

1 unit = 7

3 units = 21

$\therefore$ CE = 21cm

101. **(D)** Required average

$= \dfrac{\left(150 \times 56.3 - 120 \times 60.7\right)}{30}$

$= \dfrac{1161}{30} = 38.7$

102. **(C)** $x + 3y - 8 = 0$

$3y = -x + 8$

$y = \dfrac{-1}{3}x + \dfrac{8}{3}$

$m_1 = \dfrac{-1}{3}$

$ax + 12y + 5 = 0$

$12y = -as - 5$

$y = \dfrac{-1ax}{12} - \dfrac{5}{12}$

$m_2 = \dfrac{-1}{12}a$

$m_1 = m_2$ (when two lines are parallel)

$\dfrac{-1}{3} = \dfrac{-1}{12}a$

$a = 4$

103. **(B)**
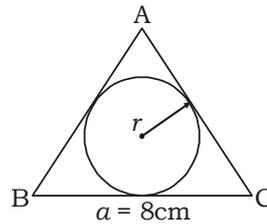
Area of triangle $= \dfrac{\sqrt{3}}{4}a^2$

$= \dfrac{\sqrt{3}}{4} \times 8 \times 8 = 16\sqrt{3}$ cm^2

radius of in circle $= r = \dfrac{a}{2\sqrt{3}} = \dfrac{8}{2\sqrt{3}} = \dfrac{4}{\sqrt{3}}$

Area of inscribed circle $= \pi r^2$

$= \pi\left(\dfrac{4}{\sqrt{3}}\right)^2 = \dfrac{22}{7} \times \dfrac{16}{3}$

$\therefore$ Required area $= \left(16\sqrt{3} - \dfrac{22 \times 16}{21}\right)$

$= \dfrac{16}{21}(21 \times 1.732 - 22)$

$= \dfrac{16}{21}(17.372) = 10.95$ cm^2

104. **(B)** Simple Interest $= \dfrac{2000 \times 75 \times 2}{1000}$

$= ₹ 300$

105. **(A)** A $\to$ 10

B $\to$ 20

C $\to$ -12

 60 Total capacity of tank

Water filled by all the three pipes (A + B + C) in 3 hours = (6 + 3 - 5) = 4 units

| Time	:	Work done
3 hours	$\to$	4 units
$\downarrow \times 13$		$\downarrow \times 13$
39 hours		52 units

Remaining work = (60 - 52) = 8 units

Work done by A on 14th day = 6 units
Remaining work = (8 – 6) = 2 units

Required time = $\dfrac{2}{3}$ hours

Total required time = 39 + 1 + $\dfrac{2}{3}$

= $40\dfrac{2}{3}$ hours

106. (C) Let the total number of Voters = $100x$

Total $100x$

A — 30% — $30x$

B — 60% of $70x$ — $42x$

Not cast — $28x$
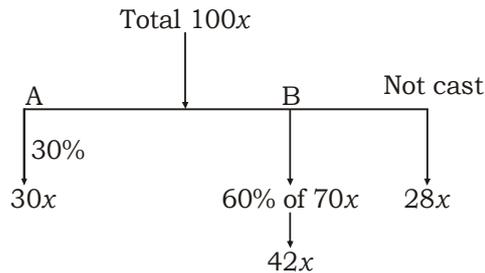
Difference of the number of voters who vote for A and who did not cost their vote
= $30x - 28x = 2x$
ATQ,
$2x = 1200$
$x = 600$
∴ Total number of voters
= 100 × 600 = 60,000

107. (B) ATQ,

$\dfrac{100 \times 85 \times 80 \times 75}{100 \times 100 \times 100} = 51$

∴ Single discount = 100 – 51
= 49%

108. (A)
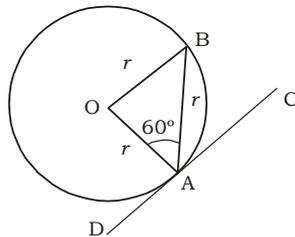
OA = OB = AB (given)
∴ ∠OAB = 60°
∠OAD = 90° (given)
Now, ∠OAD + ∠OAB + ∠BAC = 180°
∠BAC = 180° – 90° – 60°
= 30°

109. (A) $3\dfrac{1}{3} + 33\dfrac{1}{3} + 333\dfrac{1}{3} + 3333\dfrac{1}{3} + 33333\dfrac{1}{3}$

= [3+33+333+3333+33333]+

$\left[\dfrac{1}{3} + \dfrac{1}{3} + \dfrac{1}{3} + \dfrac{1}{3} + \dfrac{1}{3}\right]$

= 37035 + $1\dfrac{2}{3}$ = $37036\dfrac{2}{3}$

110. (A) A+B = 6 → 3
A = 9 → 2, (18)
B's one day work = 3 – 2 = 1

Time taken by B = $\dfrac{18}{1}$ = 18 days

111. (B) $\sqrt{998001}$ = 999

112. (B) Side = $\dfrac{240}{4}$ = 60m

Height = 20m
Area = 60 × 20 = 1200m^2

113. (C) $a^2 + b^2 + 2b + 4a + 5 = 0$
$\Rightarrow a^2 + 4a + b^2 + 2b + 5 = 0$
$\Rightarrow a^2 + 4a + 4 + b^2 + 2b + 1 = 0$
$\Rightarrow (a + 2)^2 + (b + 1)^2 = 0$
It is possible only when
$a + 2 = 0$
$\Rightarrow a = -2$
and, $b + 1 = 0$
$\Rightarrow b = -1$

∴ $\dfrac{a - b}{a + b} = \dfrac{-2 + 1}{-2 - 1}$

= $\dfrac{-1}{-3}$ = $\dfrac{1}{3}$

114. (C) Take any value of θ between 0° to 90°
Let θ = 45°

$\sin 45° = \dfrac{1}{\sqrt{2}}$

$\Rightarrow \sin^2 45° = \dfrac{1}{2}$

$\operatorname{cosec} 45° = \sqrt{2}$

Hence, $\sin θ > \sin^2 θ$

115. (C) $a^2 + 4b^2 + -4ab + 9b^2 + c^2 - 6bc = 0$
$\Rightarrow (a - 2b)^2 + (3b - c)^2 = 0$
$a = 2b$ & $3b = c$

$\dfrac{a}{b} = \dfrac{2}{1}$ & $\dfrac{b}{c} = \dfrac{1}{3}$

$a : b : c = 2 : 1 : 3$

116. (B) ∠CDE = 180° – 125° = 55°
In ΔDCE, ∠CED = 180° – 55° – 80° = 45°
and ∠B = ∠BFM = 30° (corresponding angle)

From figure,

$\angle DEF = \angle EFM$ (Alternate angle)

$\Rightarrow \angle EFM = 45°$

$\Rightarrow \angle EFB + \angle BFM = 45°$

$\Rightarrow \angle EFB = 45° - 30°$

$\Rightarrow \angle AFB = 15°$

117. (D) Required earning

$350 \times 30 + 150 \times 22.5 + 250 \times 18$

$\therefore 10500 + 3375 + 4500 = ₹18375$

118. (A) Average price per kg

$$\frac{22 + 24.5 + 21 + 28 + 30}{5}$$

= ₹25.10

119. (C) Required ratio = $\dfrac{240 \times 28}{240 \times 30}$ = 14 : 15

120. (D) Required earning 180 (24 + 26 + 20.5)

= ₹12,690

121. (C) Slapstick results in laughter and horror results in **fear**.

122. (A) U S P L : K M P T :: L J G C : **B D G K**

(pattern: +1, +3, +3, +1)

123. (A) As, $\dfrac{6^3 + 6^2}{2} = \dfrac{216 + 36}{2} = \dfrac{252}{2} = 126$

Similarly, $\dfrac{8^3 + 8^2}{2} = \dfrac{512 + 64}{2} = \dfrac{576}{2} = 288$

124. (D) A Maestro leads an orchestra and a skipper leads a crew.

125. (A) In each number except **751**, the difference of first and third digit is the middle one.

126. (D) R G T F   M L O K   C T E S
(−1, +2 pattern)

V D Z C
(−1, +4)

127. (D) All except **cortes** are currencies, while cortes is parliament of Spain.

128. (D) 28, 33, 31, 36, 34, **29**
(+3, +3, +3, +3, +3)

129. (C) 3^3 6^3 9^3

1^3 2^3 4^3 5^3 7^3 8^3 = **512**

130. (B) J A Z, L E X, N I V, P M T, **R Q R**
(−2, −2, −2, −2; +2, +4)

131. (C) 19, 28, 39, 52, **67,** 84
(+9, +11, +13, +15, +17; +2, +2, +2, +2)

132. (A)

133. (B) XX, XOX,
XXXX, XXOXX
XXXXXX, XXXOXXX

134. (A) As,
$(1 + 9) \times 2 = 20$
and,
$(9 + 5) \times 2 = 28$
Similarly,
$(7 + 3) \times 2 = 20$

135. (D) **Diagonal**

136. (D)

137. (B)

From the diagram it is clear that Anand is grandchild of Rashmi.

138. (B) Since each pole at the corner of the plot is common to its two sides, so we have :
Total number of poles needed
= 37 × 4 − 4 = 148 − 4 = 144

139. (A)

I. × II. × III. × IV. ✓

140. (C) From options (C),

$(10×7) – 2 < (10–2) × 7$

After changing the signs as per the given details,

$(10 +7) × 2 < (10× 2) + 7$

$\Rightarrow 34 < 27$

But, 34 is not less than 27

$\therefore$ Option (C) is the right Answer

141. (C) D B G A F C E
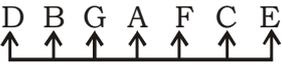
G is exactly between A and B.

142. (B)

Metal — Zinc — Mercury

143. (C)

Goat / Tiger / Lion
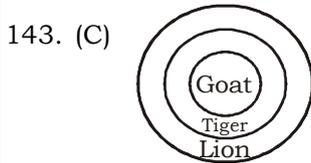
I. ×   II. ×

III. ×   IV. ×

$\therefore$ None of the conclusions follow.

144. (D) t/sr**s**/tr**t**/srs**t**/r**t**/srst**r**

145. (A) Raman → 15 May < Exam < 18 May

Deep → 16 May < Exam < 21 May

$\therefore$ Exam is on 17.

146. (C)

147. (A)

148. (B)

North / West / Home / East / South
5m 5m / 10 m / 10m / 3m / 180°
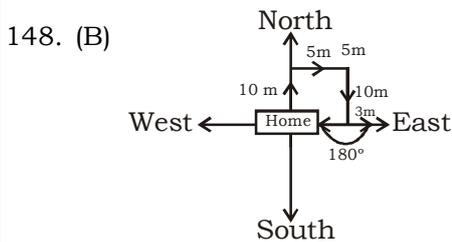
149. (A) $T = 3 + \left[\dfrac{2}{11}(3 \times 30 + 0)\right]$

$= 3 + \dfrac{180}{11} = 3$ past $16\dfrac{4}{11}$ minutes

150. (C) As,

M A T E R I A L

R I A L M A T E

Similarly,

151. (A)

R E M E M B E R
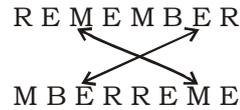
M B E R R E M E

152. (A)

S	Y	N	D	R	O	M	E
↓	↓	↓	↓	↓	↓	↓	↓
5	6	1	7	2	4	3	8

153. (A) Ayush's present age = 10 years.

His mother's present age = (10 + 20) = 30 years

Ayush's father's present age = (30 + 5) = 35 years

Ayush's father's age at the time of Ayush's birth = (35 – 10) = 25 years.

Therefore Ayush's father's age at the time of marriage = (25 – 2) = **23 years**

154. (A)

Great Grandfather / Father / Shubham / Grandson / Brother / Father / Uncle / Father / Suman
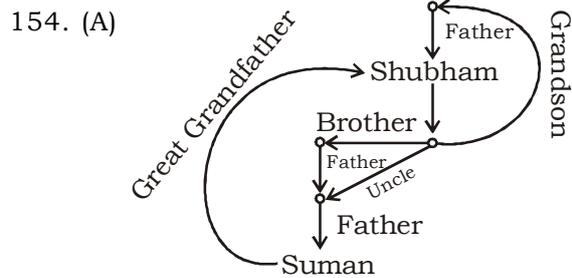
Shubham is Great Grandfather of Suman.

155. (A) he is game [game] → # [*]

good / [game] / (Play) → ($) [*] &

(Play) that hard → ! ($) %

$\therefore$ Code for good → &

156. (A) The sets of letters represents opticians who are either Europeans or Campers is **I D H**

157. (A)

158. (A) $16 – 2 ÷ 40 + 4 × 18 = 40$

After interchanging the signs, according to option (A)

$16 ÷ 2 – 40 + 4 × 18 = 40$

$\Rightarrow 8 – 40 + 72 = 40$

$\Rightarrow 40 = 40$

159. (D)

160. (B) Rain → Sun → Rainbow → Child → Happy

UP SI ANSWER KEY - 48

1. (D)	21. (B)	41. (A)	61. (B)	81. (B)	101. (D)	121. (C)	141. (C)
2. (A)	22. (C)	42. (D)	62. (A)	82. (D)	102. (C)	122. (A)	142. (B)
3. (B)	23. (A)	43. (C)	63. (B)	83. (B)	103. (B)	123. (A)	143. (C)
4. (B)	24. (A)	44. (A)	64. (A)	84. (D)	104. (B)	124. (D)	144. (D)
5. (C)	25. (A)	45. (B)	65. (D)	85. (B)	105. (A)	125. (A)	145. (A)
6. (B)	26. (C)	46. (B)	66. (C)	86. (B)	106. (C)	126. (D)	146. (C)
7. (A)	27. (B)	47. (C)	67. (D)	87. (D)	107. (B)	127. (D)	147. (A)
8. (C)	28. (B)	48. (A)	68. (C)	88. (A)	108. (A)	128. (D)	148. (B)
9. (A)	29. (A)	49. (A)	69. (A)	89. (C)	109. (A)	129. (C)	149. (A)
10. (C)	30. (B)	50. (A)	70. (B)	90. (D)	110. (A)	130. (B)	150. (C)
11. (A)	31. (C)	51. (C)	71. (D)	91. (A)	111. (B)	131. (C)	151. (A)
12. (A)	32. (C)	52. (A)	72. (B)	92. (C)	112. (B)	132. (A)	152. (A)
13. (A)	33. (C)	53. (B)	73. (C)	93. (A)	113. (C)	133. (B)	153. (A)
14. (B)	34. (D)	54. (A)	74. (D)	94. (A)	114. (C)	134. (A)	154. (A)
15. (D)	35. (B)	55. (C)	75. (D)	95. (A)	115. (C)	135. (D)	155. (A)
16. (D)	36. (C)	56. (B)	76. (A)	96. (B)	116. (B)	136. (D)	156. (A)
17. (B)	37. (D)	57. (A)	77. (C)	97. (B)	117. (D)	137. (B)	157. (A)
18. (D)	38. (B)	58. (B)	78. (B)	98. (A)	118. (A)	138. (B)	158. (A)
19. (B)	39. (C)	59. (B)	79. (A)	99. (B)	119. (C)	139. (A)	159. (D)
20. (A)	40. (D)	60. (B)	80. (B)	100. (C)	120. (D)	140. (C)	160. (B)