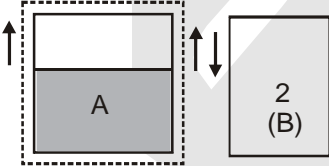


NATIONAL STANDARD EXAMINATION IN JUNIOR SCIENCE
NSEJS_STAGE-I (2014-15)
PAPER CODE : JS-524

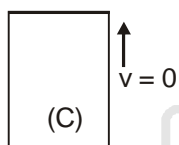
HINTS & SOLUTIONS

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans	b	d	c	d	b	d	b	c	b	c	b	a	d	d	a	c	a	d	b	c
Ques.	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Ans	a	d	d	b	d	c	d	c	d	c	a	c	b	c	a	c	d	c	a	a
Ques.	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Ans	a	a	b	b	d	d	c	a	d	c	Bonus	a	a	b	d	b	c	d	c	c
Ques.	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Ans	a	a	d	b	a	d	d	a	a	Bonus	d	b	d	c	b	d	a	a	a	a

1. 

$$S_{8th} = u + \frac{a}{2} (1S)$$

$$\% \left(\frac{\frac{a}{2}(2)}{\frac{a}{2}1S} \right) \times 100 = 13.3\%$$


9. as $F_B = SVG$ remaining constant

Due to change in weight
 $P_A > P_C > P_B$

3. Number of square = $\frac{n(n+1)(2n+1)}{6}$

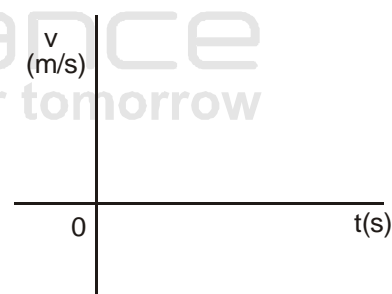
6. $8l \rightarrow 1 \text{ hr}$

$4 \times 1.5l \rightarrow \frac{1}{8} \times 4 \times 1.5 \text{ hr} = \frac{3}{4} \text{ hr} = 45 \text{ min}$

8. $S_{7th} = u + \frac{1}{2} a(2(9) - 1)$

$= u + \frac{a}{2} (17)$

16.



- (i) acceleration at 4 sec – given by slop hence negative (2)
 (ii) Velocity at 4 sec = 0 (r)
 (iii) v = positive (p)

11. Number of marbles in one layer = $10 \times 10 = 100$
 Number of marbles in box = Number of layer \times
 Number of marbles in one layer
 $= 10 \times 100$
 $= 1000$

14. Cost = Shaded area \times cost rate
 $= (\text{area of circle} - \text{area of hexagon}) \times \text{cost rate}$
 $= [\pi(10)^2 - 6 \times \frac{\sqrt{3}}{4} (10)^2] \times 10$
 $= 86.70 \text{ Rs.}$
 $= 87 \text{ Rs.}$ (Roundoff)

19. $\frac{x-1}{2} (1+x-1) = \frac{49-x}{2} (x+1+49)$
 on solving we get $x = 35$

20. $3000 = 10.n + 2.10.(n-1) + \dots + 2.10.1 + 2.10.1 + \dots + 2.10.n$
 $3000 = -10n + 2 \times 10n + 2 \times 10(n-1) + 2 \times 10(n-2) + \dots + 2 \times 10 \times 1$
 $+ 2 \times 10 \times 1 + 2 \times 10 \times 2 + \dots + 2 \times 10 \times n$
 $3000 = 40 [1 + 2 + \dots + n] - 10n$

$$300 = 4 \frac{n(n+1)}{2} - n$$

$$2n^2 + n - 300 = 0$$

$$2n^2 + 25n - 24n - 300 = 0$$

$$n(2n + 25) - 12(2n + 25) = 0$$

$$(n - 12)(2n + 25) = 0$$

$$n = 12, -25/2$$

$$\text{no of stones} = 2n + 1 = 2 \times 12 + 1 = 25$$

26. 215

31. $60 \begin{cases} 24 \\ 36 \end{cases}$

$$P_1 = 24 = 4a$$

$$a_1 = 6$$

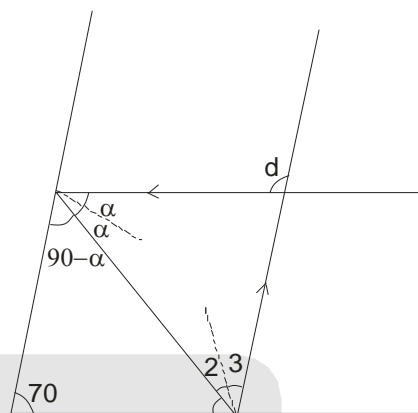
$$P_2 = 36 = 4a_2$$

$$a_2 = 9$$

$$\frac{A_2}{A_1} = \frac{9^2}{6^2} = \frac{81}{36} = \frac{9}{4}$$

34. Initial fuel = 100 l
 \downarrow 50% of $100 \text{ l} = 50 \text{ l}$
 $100 \text{ l} - 50 \text{ l} = 50 \text{ l}$
 \downarrow 30% of $50 \text{ l} = 15 \text{ l}$
 $50 \text{ l} - 15 \text{ l} = 35 \text{ l}$
 \downarrow 20% of $35 \text{ l} = 7 \text{ l}$
 $35 \text{ l} - 7 \text{ l} = 28 \text{ l}$

37.



$$\angle 1 = 180 - (70 + 90 - \alpha)$$

$$= 20 + \alpha$$

$$\angle 2 = 90 - \angle 1 = 90 - 20 - \alpha$$

$$= 70 - \alpha$$

$$\angle 2 = \angle 3 = 70 - \alpha$$

$$\angle d = 2\alpha + 2(70 - \alpha) = 140$$

39.

$$5a^2 = 20\% \text{ of } (100)$$

$$5a^2 = 20$$

$$a^2 = 4$$

$$a = 2$$

46.

$$1 + 2 + 3 + \dots + n = \frac{n(n+1)}{2}$$

$$(a) \frac{n(n+1)}{2} = 1431$$

$$n(n+1) = 2862$$

$$n = 53$$

$$(b) \frac{n(n+1)}{2} = 190$$

$$n(n+1) = 380$$

$$n = 19, n+1 = 20$$

$$(c) \frac{n(n+1)}{2} = 28$$

$$n(n+1) = 56$$

$$n = 7$$

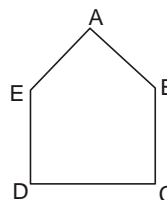
$$(d) \frac{n(n+1)}{2} = 506$$

$$n(n+1) = 1012$$

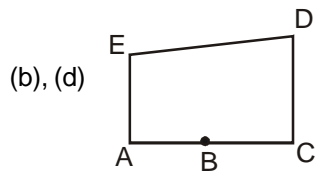
no natural value of n possible.

51.

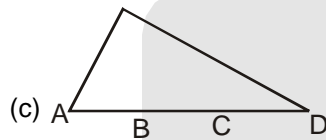
(a)



$AB + BC = AC$
 $230 + 120 = 350$
 A, B, C are collinear



$BD > BC + CD$
 $330 > 120 + 200$
 No triangle can be formed



$BD \neq BC + CD$
 $330 \neq 120 + 200$
 B, C, D are not collinear

56.

$$\begin{aligned}
 x + y &= 7x \\
 y &= 7x - x \\
 xyx &= 100x + 10y + x \\
 &= 100x + 10(7x - x) + x \\
 &= 100x + 70x - 10x + x \\
 &= 91x + 70x \\
 &= 7(13x + 10)
 \end{aligned}$$

59. 1 min \rightarrow full

59 sec $\rightarrow \frac{\text{full}}{3}$

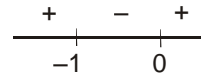
58 sec $\rightarrow \frac{\text{full}}{9}$

60. Anything divide by zero is not defined.

65.

$$\begin{aligned}
 n + 1 &= 3m_1 \\
 n &= 3m_1 - 1 = (3m_1 - 3) + 2 \\
 n &= 4m_2 - 2 = (4m_2 - 4) + 2 \\
 n &= 5m_3 - 3 = (5m_3 - 5) + 2 \\
 n &= 6m_4 - 4 = (6m_4 - 6) + 2 \\
 \therefore n &\text{ is LCM of } (3, 4, 5, 6) + 2 \\
 n &= 60 + 2 \\
 &= 62
 \end{aligned}$$

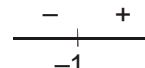
68. $\frac{x}{x+1} > 0$ and $\frac{x}{x+1} < 1$



$$\frac{x}{x+1} - 1 < 0$$

$$\frac{x - x - 1}{x+1} < 0$$

$$\frac{1}{x+1} > 0$$



$$x > -1$$

$x > 0$ or $x < -1$
 so final answer is
 $x > 0$
 i.e. set off all positive real number.

73.

$$\begin{aligned}
 abcd \\
 a &= b^2 \\
 c &= 3b \\
 d &= 2b \\
 a + b + c + d &= 3a \\
 b + c + d &= 2a \\
 b + 3b + 2 &= 2b^2 \\
 6b - 2b^2 &= 0 \\
 2b(3 - b) &= 0 \\
 b &= 0 \text{ or } b = 3 \\
 b &= 3, a = 9, c = 9, d = 6 \\
 \text{No} &= 9396
 \end{aligned}$$

76. Insufficient data