



UNIFIED COUNCIL

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UNIFIED CYBER OLYMPIAD (UPDATED)

CLASS - 10

Question Paper Code : UC345

KEY

1. C	2. D	3. C	4. A	5. C	6. D	7. C	8. B	9. C	10. A
11. B	12. B	13. B	14. A	15. C	16. B	17. D	18. D	19. B	20. C
21. B	22. D	23. A	24. D	25. A	26. D	27. B	28. C	29. D	30. A
31. B	32. C	33. B	34. B,C	35. D	36. B	37. A	38. A	39. C	40. D
41. B	42. B	43. C	44. D	45. C	46. B	47. A	48. C	49. A	50. C

SOLUTIONS

MENTAL ABILITY

$$\begin{array}{r}
 1. \text{ (C) } 1560) 1755(1 \\
 \underline{1560} \\
 195) 1560(8 \\
 \underline{1560} \\
 \textcircled{0}
 \end{array}$$

$$\begin{array}{r}
 195) 2925(15 \\
 \underline{2925} \\
 \textcircled{0}
 \end{array}$$

HFC of 1560, 1755 and 2925 is 195

2. (D) Let usual speed be 'x' KMPH

$$\text{Given } \frac{300}{x} - \frac{300}{x+5} = 2$$

$$\frac{300x + 1500 - 300x}{x^2 + 5x} = 2$$

$$1500 = 2(x^2 + 5x)$$

$$x^2 + 5x - 750 = 0$$

$$x^2 + 30x - 25x - 750 = 0$$

$$(x + 30)(x - 25) = 0$$

$$x = 25 \text{ kmph}$$

3. (C)
$$\frac{x^2+1}{x^{19}+x^{17}} \cdot \frac{x^{13}+x^{11}+x^7}{x^{13}+x^{11}+x^7}$$

$$\frac{x^{13}+x^{11}+x^7}{x^{13}+x^{11}+x^7}$$

$$\frac{x^7}{x^7+x^5}$$

$$\frac{-x^5}{-x^5-x^3}$$

$$\frac{x^3}{x^3+x}$$

$$\frac{-x}{-x}$$

4. (A) Let $a - d$, a , $a + d$ are the three consecutive numbers

Given $a + d + a + a + d = 57$ is $R = 19$

Given $(a - d)(a)(a + d) = 6555$

$(19 - d)(19)(19 + d) = 6555$

$(19 - d)(19 + d) = \frac{6555}{19} = 345$

$19^2 - d^2 = 345$

$361 - 345 = d^2$

$d = \sqrt{16} = 4$

$\therefore a - d = 15$, $a = 19$ and $a + d = 23$

5. (C) Favourable out comes are

$(1,2) (1,3) (1,4) (1,5) (1,6), (2,1) (2,3) (2,4) (2,5), (3,1) (3,2) (3,4) (3,6) (4,1) (4,2) (4,3) (4,5) (4,6), (5,1) (5,2) (5,4) (5,6), (6,1) (6,3) (6,4) (6,5)$

\therefore Required probability $\frac{26}{36} = \frac{13}{18}$

6. (D) $P = 5$ & $q = 6$

$P + q = 11$

7. (C) $(x^2 - 1)^3 (x - 3x + 2) = [(x - 1)(x + 1)]^3 (x - 1)(x - 2)$

$= (x - 1)^4 (x + 1)^3 (x - 2)$

Three distinct zeros are there

8. (B) Given $b^2 = 4ac$

$(2mc)^2 = 4(1+m^2)(c^2 - a^2)$

$4m^2c^2 = 4(1 + m^2)(c^2 - a^2)$

$m^2c^2 = c^2 - a^2 + m^2c^2 - m^2a^2$

$a^2 + a^2 m^2 = c^2$

$a^2(1 + m^2) = c^2$

9. (C) Given $A = \frac{a+b}{2}$

$LHS = \frac{A+2b}{A-b} + \frac{A+2b}{A-a}$

$= \frac{\frac{a+b}{2} + 2a}{\frac{a+b}{2} - b} + \frac{\frac{a+b}{2} + 2b}{\frac{a+b}{2} - a}$

$= \frac{5a+b}{a-b} + \frac{a+5b}{b-a}$

$= \frac{5a+b-a-5b}{(a-b)}$

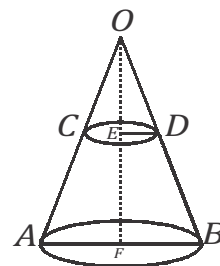
$= \frac{4a-4b}{a-b}$

$= 4$

10. (A) Let $OE = h$ units, $OF = H$ units,

$OD = l$ units, $OB = L$ units,

$ED = r$ units, $FB = R$ units.



In $\triangle OED$ and $\triangle OFB$, we have

$\angle EOD = \angle FOB$ (common)

$\angle OED = \angle OFB = 90^\circ$

$\therefore \triangle OED \sim \triangle OFB$

$$\Rightarrow \frac{OE}{OF} = \frac{OD}{OB} = \frac{ED}{FB} \Rightarrow \frac{h}{H} = \frac{l}{L} = \frac{r}{R} \dots (i)$$

[by Thales' theorem]

Now, (curved surface area of the frustum CABD)

$$= \frac{8}{9} \text{ (curved surface area of the cone OAB)} \dots (ii)$$

(Curved surface area of the cone OCD)

= (Curved surface area of cone OAB) -

(Curved surface area of frustum CABD)

= (Curved surface area of cone OAB) -

$$\frac{8}{9} \text{ (Curved surface area of cone OAB)}$$

[using (ii)]

$$= \frac{1}{9} \text{ (curved surface area of cone OAB)}$$

$$\Rightarrow \pi r l = \frac{1}{9} \pi R L$$

$$\Rightarrow \left(\frac{r}{R}\right) \cdot \left(\frac{l}{L}\right) = \frac{1}{9} \Rightarrow \left(\frac{h}{H} \times \frac{h}{H}\right) = \frac{1}{9}$$

$$\Rightarrow \frac{h}{H} = \frac{1}{3} \quad [\text{Using (i)}]$$

$$\Rightarrow H = 3h \quad \dots (iii)$$

Now, $EF = (OF - OE) = (H - h) = (3h - h)$

$= 2h$ [$\because OF = H = 3h$ and $OE = h$]

$$\therefore \frac{OE}{EF} = \frac{h}{2h} = \frac{1}{2}$$

Thus, the required ratio = $OE : EF = 1 : 2$

11. (B) $5x^2 - 4x + 2 + 4m x^2 - 2mx - m = 0$

$$x^2 (5 + 4m) + x (-4 - 2m) + (-m + 2) = 0$$

Given $\frac{c}{a} = 3$

$$\frac{-m + 2}{5 + 4m} = 3$$

$$-m + 2 = 15 + 12m$$

$$-13 = 13m$$

$$m = -1$$

12. (B) Non prime numbers are 1, 4, 6, 8, 9, 10, 12, 14, 15, 16, 18, 20, 21, 22, 24, 25

\therefore Favourable outcomes = 16

\therefore Probability of a number which is not a prime

$$\text{from 1 to 25} = \frac{16}{25}$$

13. (B) Let present age of Jacob be 'x' years and his son's age be 'y' years.

$$\therefore x + 5 = 3(y + 5)$$

$$x + 5 = 3y + 15$$

$$x - 3y = 10 \quad \dots (1)$$

Given $(x - 5) = 7(y - 5)$

$$x - 7y = -30 \quad \dots (2)$$

Solving (1) and (2)

$$4y = 40$$

$$y = 10 \text{ years}$$

14. (A) Given $h = a$ and $h^3 = \pi r^2 h$

$$h^3 = \pi r^2 h$$

$$\pi r^2 = h^2$$

$$r^2 = \frac{h^2}{\pi}$$

$$r = \frac{h}{\sqrt{\pi}}$$

15. (C) Given $12a + 17a + 25a = 540$ cm

$$a = 10 \text{ cm}$$

$$\therefore \Delta = \sqrt{s(s-a)(s-b)(s-c)}$$

$$= \sqrt{270(150)(100)20}$$

$$= 100\sqrt{27 \times 15 \times 10 \times 2}$$

$$= 100 \times 90$$

$$= 9000 \text{ cm}^2$$

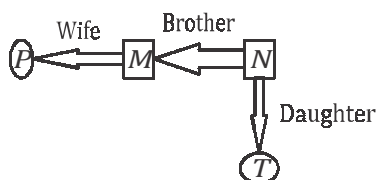
REASONING

16. (B) $\overbrace{ABCDEFGHIJKL}^{\text{Letters}}$
 $\underbrace{PQRSTUVWXYZMNOPQDE}_{\text{Letters}}$

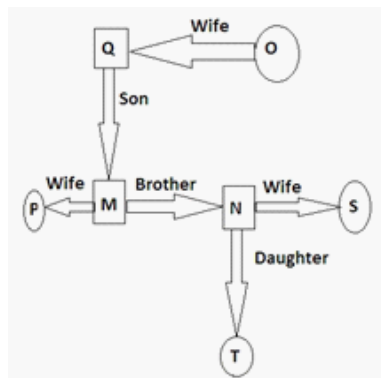
So 5th letter from W (or) E is our answer which is "N".

17. (D) Each set consists of numbers which are obtained by multiplying a certain number by 9, 7 and 5 respectively. Thus, in the given set, $63 = 7 \times 9$, $49 = 7 \times 7$, $35 = 7 \times 5$ Similarly, $81 = 9 \times 9$, $63 = 9 \times 7$, $45 = 9 \times 5$.

18. (D) Given M and N are brothers, T is the only niece of M and P is the sister-in-law of N.



Also given T is the daughter of S, O is the mother-in-law of S and R is the grandson of Q. The relation is given below.



But R can be the son of either M or N.

R can be either brother or cousin of T.

19. (B) first letter is deleting in next word. and adding a then b, then c with replacement.

20. (D) In this language, the noun appears first and the adjectives follows. Since agnos means spider and should appear first, choices (A) and (D) can be ruled out. Choice (B) can be ruled out because delano means snake.

21. (B) Mathematics is the theory of numbers and history is the theory of past events.

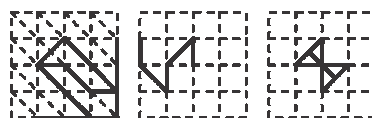
22. (D) KALINGASRIB

23. (A) In each row, Sum of 1st two digit number + last two digit number = Middle two digit number i.e., 1st row $15 + 40 = 55$; 2nd row $46 + 47 = 93$; Similarly, $7x + 16 = 87 \Rightarrow x = 1$.

24. (D) There are three series to look for here. The first letters are alphabetical in reverse: Z, Y, X, W, V. The second letters are in alphabetical order, beginning with A. The number series is as follows: 5, 4, 6, 3, 7.

25. (A) 1, 6, 9 are figures which are half shaded by slanting lines. 2, 4, 7 are all divided into equal parts by straight lines and also have a black circle at the centre.

26. (D) First letter move 3 step forward and second letter move 2 step forward.



27. (B)

Option B is not hidden in figure 'x'.

28. (C) SPINACH

It is a large green leaves plant.

29. (D) $J \div R - T \times F$ means J is the brother of R who is the sister of T who is the father of F i.e. J is the uncle of F.

$J + R - T \times F$ means J is the mother of R who is the sister of T who is the father of F i.e. J is the grand mother of F.

$J \div M - N \times F$ means J is the brother of M who is the sister of N who is the father of F i.e. J is the uncle of F.

Here, none of the options follow.

30. (A) In the afternoon, the sun is in the west. Hence the shadow is in the east. Now east is to the left of Swati, so Swati is facing towards south. Therefore, Vandana, who is face to face with Swati, facing towards North.

COMPUTERS

31. (B) 32. (C) 33. (B)
34. (B,C) 35. (D) 36. (B)
37. (A) 38. (A) 39. (C)
40. (D) 41. (B) 42. (B)
43. (C) 44. (D) 45. (C)

ENGLISH

46. (B) 47. (A) 48. (C)
49. (A) 50. (C)

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The End
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