UNIFIED COUNCIL

An ISO 9001:2008 Certified Organisation

UCO Unified Cyber Olympiad

UNIFIED CYBER OLYMPIAD - UC335 (UPDATED)

Solutions for class : 10

Mental Ability

1. Delete

2. **(B)** Rule: H.C.F. of the repeated numbers is the H.C.F. of the number of digits in the numbers.

3. **Del** $f(x) = x^2 + px + q \Rightarrow f(-a) = a^2 - pa + q = 0$

$g(x) = x^2 + lx + m \Rightarrow g(-a) = a^2 - la + m = 0$

$\Rightarrow a^2 - pa + q = a^2 - la + m \Rightarrow a = \dfrac{q-m}{p-l}$

4. **(B)** $f(x) = x^{19} + x^{17} + x^{13} + x^{11} + x^7 + x^5 + x^3$

putting $x^2 = -1$, we get

$f(x) = (x^2)^9, x + (x^2)^8 + (x^2)^6. x + (x^2)^5. x + (x^2)^3. x + (x^2)^2 . x + x^2. x$

$= (-1)^9. x + (-1)^8. x + (-1)^2. x + (-1)^5. x + (-1)^3. x + (-1)^2. x + (-1)x.$

$= -x + x + x - x + x + x - x = -x.$

5. **(D)** $t_{18} - t_{13} = 17d - 12d = 5d = 5 \times 5 = 25$

6. **(C)** $y = \dfrac{1}{2}x - 3$

7. **(C)** $y = 3x - 5$ satisfies all the points.

8. **(B)** Given $\dfrac{\sqrt{p^2 - 4q}}{1} = \dfrac{\sqrt{q^2 - 4p}}{1}$

$\Rightarrow p^2 - 4q = q^2 - 4p$

$\Rightarrow p^2 - q^2 = -4(p - q)$

$\Rightarrow p + q = -4$

9. **(B)** $\alpha + \beta = -p, \alpha\beta = p^2 + q$

$\alpha^2 + \alpha\beta + \beta^2 + q = (\alpha + \beta)^2 - \alpha\beta + q$

$= p^2 - (p^2 + q) + q$

$= 0$

10. **(A)** $S_n = 2n + 3n^2$

$S_r = 2r + 3r^2,$

$S_{r-1} = 2(r-1)(r-1)^2$

$t_r = S_r - S_{r-1}$

$= 2r + 3r^2 - [2(r-1) + 3(r-1)^2]$

$= [2r + 3r^2 - 2r + 2 - 3(r^2 - 2r + 1)]$

$= 6r - 1$

11. **(C)** 1st Series: We have $3 + 10 + 17 + ...$

$a_1 = 3$ and $d_1 = 10 - 3$

$= 17 - 10 = 7$

$Tn = a_1 + (n-1)d_1$

$= 3 + (n-1)\,7 = 7n - 4.$

2nd Series: $63 + 65 + 67 + ...$

$a_2 = 63$ and $d_2 = 65 - 63$

$= 67 - 65 = 2$

$T_n = a_2 + (n-1)d_2$

$= 63 + (n-1)2 = 2n + 61.$

Let nth terms of given series be equal.

$7n - 4 = 2n + 61$

$5n = 65$

$n = 13.$

12. **(B)** A straight line is parallel to Y - axis, if its y coefficient is zero.

i.e., $4 - k = 0$

$k = 4$

13. **(A)** Here $s = \dfrac{a+b+b}{2}$ units $= \dfrac{a+2b}{2}$ units

$\therefore$ Area of the triangle

$= \sqrt{\left(\dfrac{a+2b}{2}\right)\left(\dfrac{a+2b}{2} - a\right)\left(\dfrac{a+2b}{2} - b\right)\left(\dfrac{a+2b}{2} - b\right)}$ sq units

$= \sqrt{\left(\dfrac{a+2b}{2}\right)\left(\dfrac{2b-a}{2}\right)\left(\dfrac{a}{2}\right)\left(\dfrac{a}{2}\right)}$ sq units

$= \dfrac{a}{4}\sqrt{(a+2b)(2-b)}$ sq units

$= \dfrac{a}{4}\sqrt{4b^2 - a^2}$ sq units

14. **(A)** $a^2 = 16 \times 4 = 64 \Rightarrow a = 8$

perimeter $= 8 \times 3 = 24$ cm.

15. **(C)** Diameter of the wheel = 4 ft

$\therefore$ Radius of the wheel = 2 ft

Circumference of the wheel

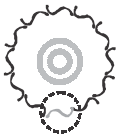
$= 2\pi r = 2\pi(2) = 4\pi$ ft

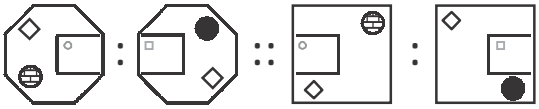
$\therefore$ Speed of the train $= 6 \times 4\pi = 24\pi$ ft/sec

Reasoning

16. **(B)** 

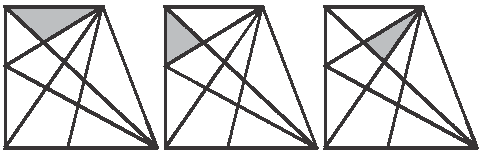
17. **Delete**

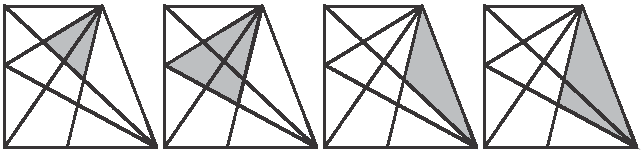
18. **(C)** 

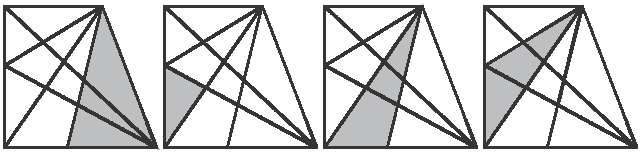
19. **(D)** 

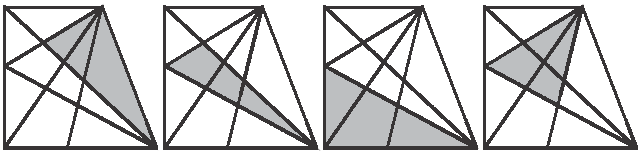
20. **(D)** 

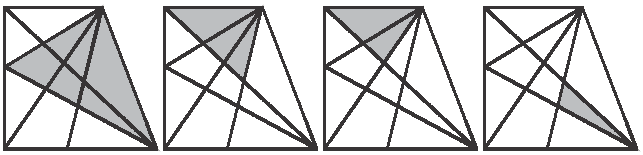
21. **(C)** *Rotation of the letters.*

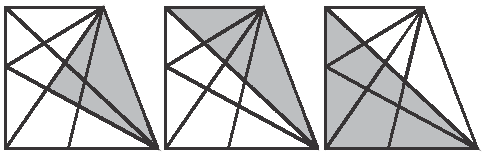
22. **(D)** 











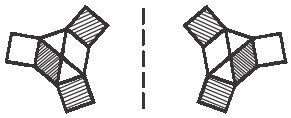
There are more than 21 triangles.

23. **(B)** *From the first sentence it is clear that A is brother of K. Hence option (B) is not true.*

24. **(B)** $5^2 + 2^2 + 1^2 = 30$ $\quad$ $6^2 + 5^2 + 2^2 = 65$

$6^2 + 2^2 + 1^2 = 41$ $\quad$ $6^2 + 5^2 + 1^2 = 62$

25. **(C)** *The new letter sequence is I M F S R O U T E N. The 8th letter counting towards left is T.*

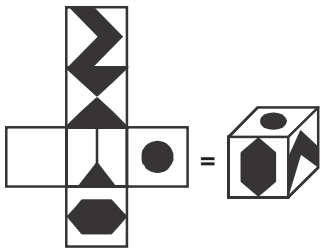
26. **(A)** 

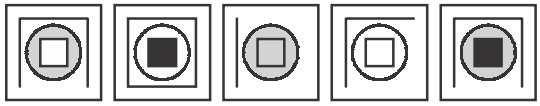
27. **(B)** *7528 : 7528 – 2222 = 5306*

Similarly 4673 : 4673 – 2222 = 2451

28. **(B)** 

Hence code is TS

29. **(B)** 

30. **(C)** 

Computers

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

English

46. **(C)** 47. **(A)** 48. **(D)** 49. **(C)** 50. **(D)**