PACE IIT | MEDICAL

ANDHERI / BORIVALI / DADAR / THANE / POWAI / CHEMBUR / NERUL / KHARGHAR

ACE OF PACE

ADVANCED (CODE - 01) **ANSWERS KEY** **DATE:25/06/2017**

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

ACE OF PACE OBJECTIVE SECTION (SOLUTION)

1. **(C)**

2. **(A)**

3. **(C)**

4. **(B)**

5. **(A)**

6. **(C)**

$a = \text{Length}\ \ b = \text{breadth}$

New area = $0.99 \times (1.01)ab$

$= .9999\,ab$

$\therefore 0.01\%$ decrease in area

7. **(C)**

$x - \frac{1}{x} = 3 \Rightarrow x^2 + \frac{1}{x^2} - 2 = 9$

$x^2 + \frac{1}{x^2} = 11 \Rightarrow x^4 + \frac{1}{x^4} + 2 = 121$

$\Rightarrow x^4 + \frac{1}{x^4} = 119$

8. **(A)**

9. **(B)**

We have

$\angle OFE = 180^o - \angle CFE$

$= 180^o - 140^o = 40^o$

In ΔFOE

$\angle OFE + \angle FOE + \angle OEF = 180^o$

$40^o + \left(180^o - y^o\right) + \left(180^o - x^o\right) = 180^o$

$x + y = 220$

10. **(A)**

$12 + 12 + 4 = 28$ Triangle

11. **(B)**

12. **(B)**

13. **(C)**

14. **(C)**

Let a = 6.73 , b = 3.27

$$\frac{a^3+b^3}{a^2+b^2-ab}=\frac{(a+b)(a^2+b^2-ab)}{(a^2+b^2-ab)}=a+b=6.73+3.27=10$$

15. **(C)**

16. **(D)**

17. **(C)**

Fraction = $\frac{x-3}{x}$

Now, $\frac{x-3}{x+(x-3)}=\frac{2}{7}$

$\Rightarrow 7x-21=4x-6\Rightarrow x=5$

$\therefore$ fraction = $\frac{2}{5}$

18. **(C)**

19. **(C)**

20. **(A)**

Let the age of father be x & age of son be y, then

$x-10=6(y-10)$ ……(1)

$x+10=2(y+10)$ …….(2)

$\text{eq.}2\times 3-\text{eq.}(1)$

$2x+40=60+60$

$\Rightarrow 2x=80\Rightarrow x=40$

Put x = 40 in (1)

$40-10=6y-60$

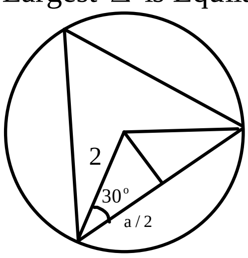
$30+60=6y$

$\frac{90}{6}=y$

$y=15\,\text{years}$

21. **(C)**

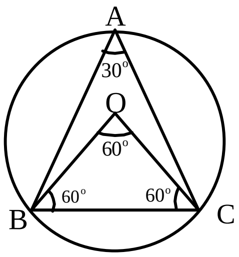
Largest Δ is Equilateral



$2\cos 30^\circ=\frac{a}{2}$

$a=2\sqrt{3}$

22. **(D)**



$\therefore \angle OBC = 60^o$

23. **(B)**

$=16-9+18\times3\div20$
$=16+9\times18\div3-20$
$=16+9\times6-20$
$=16+54-20=40$

24. **(A)**

Let $P(y)=y^3+my^2-2y+m+4$ as y + m is a factor of $P(y)$, so by the factor theorem, we have

$P(-m)=0$

$\Rightarrow (-m)^3+m(-m)^2-2(-m)+m+4=0$

$\Rightarrow 3m=-4$

$m=-\frac{4}{3}$

25. **(B)**

$x^2-3x+2=0$

$\alpha+\beta=3,\ \alpha\beta=2$

$\frac{\alpha}{\beta}+\frac{\beta}{\alpha}=\frac{\alpha^2+\beta^2}{\alpha\beta}=\frac{(\alpha+\beta)^2-2\alpha\beta}{\alpha\beta}$

$=\frac{(3)^2-4}{2}=\frac{5}{2}$

26. **(D)**

$x+y+z=0$

$\frac{x^3+y^3+z^3}{xyz}=\frac{3xyz}{xyz}=3$

27. **(A)**

$(\sec\theta-\tan\theta)=\frac{1}{\sec\theta+\tan\theta}=4$

$\sec\theta-\tan\theta=4$

$\sec\theta+\tan\theta=\frac{1}{4}$

Adding $\Rightarrow$ $2\sec\theta=4+\frac{1}{4}=\frac{17}{4}$

$\sec\theta=\frac{17}{8}$ hence $\cos\theta=\frac{8}{17}$

28. **(C)**

Since the total number of out comes is 2 and 1 is favourable event P(T) = $\frac{1}{2}$

29. **(C)**

$$\text{Mean} = \frac{1+1+8+3+6+1+1+8+8+1}{10} = 3.8$$

30. **(A)**

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

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

31. **(A)**

$$\frac{1}{\sqrt{5}+\sqrt{3}-\sqrt{8}} \times \frac{\sqrt{5}+\sqrt{3}+\sqrt{8}}{\sqrt{5}+\sqrt{3}+\sqrt{8}}$$

$$= \frac{\sqrt{5}+\sqrt{3}+\sqrt{8}}{2\sqrt{15}}$$

Now, we do a second rationalization step

$$= \frac{\left(\sqrt{5}+\sqrt{3}+\sqrt{8}\right)}{2\sqrt{15}} \times \frac{\sqrt{15}}{\sqrt{15}}$$

$$= \frac{5\sqrt{3}+3\sqrt{5}+2\sqrt{30}}{30}$$

$$= \frac{1}{6}\sqrt{3}+\frac{1}{10}\sqrt{5}+\frac{1}{15}\sqrt{30}$$

Comparing with the expression given in the question, we have

$$a=\frac{1}{6}, b=\frac{1}{10}, c=\frac{1}{15}$$

$$\Rightarrow 6(a+b+c) = 6\left(\frac{1}{6}+\frac{1}{10}+\frac{1}{15}\right) = \cancel{6} \times \left(\frac{\cancel{10}}{\cancel{30}}\right) = 2$$

32. **(D)**

$7^1 = 7$

$7^2 = 49$

$7^3 = 243$

$7^4 = 2401$ Since number unit digits will repeat after multiple of 4

Hence answer is 1

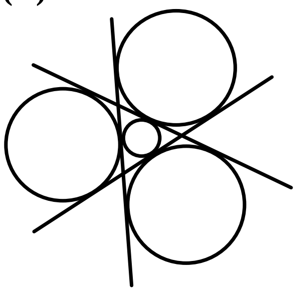
33. **(A)**

An observation which has maximum frequency in the data is called the mode of the data.

34. **(D)**

$$3, 3+\frac{1}{3}, 3+\frac{1}{3}+\frac{1}{3^2}, 3+\frac{1}{3}+\frac{1}{3^2}+\frac{1}{3^3} \ldots\ldots\ldots\ldots\ldots\ldots\ldots$$

35. **(D)**



Hence there are 4 circles touching all three sides

36. **(B)**

Each sister has 7 Bags
Each Bag has 7 adult cats.
So, each sister has 49 adult cats & $49 \times 7 = 343$ little cats
So, 7 sisters will have $49 \times 7 = 343$ adult cats & $343 \times 7 = 2401$ little cats
Total cats = 2744. Total cat legs = 2744 × 4 = 10976
Your sisters legs = $7 \times 2 = 14$. Your legs = 2
Total legs = $10976 + 14 + 2 = 10992$

37. **(D)**

x mod 7 = 5, x mod 6 = 4 , x mod 5 = 3
x mod 4 = 2, x mod 3 = 1
As you can see, x + 2 is divided by 3, 4, 5, 6, 7.
So, (x + 2) mod LCM (3,4,5,6,7) = 0
LCM (3,4,5,6,7) = 420
x + 2 = 0, 420, 840, 1260
x = -2, 418, 838, 1258
so, x = 418. Sum of digits = 13.

38. **(C)**

$x^2 + (-2a + 9)x + (a^2 - 11a + 10) = 0$

(i) $D > 0 \rightarrow$ Real & distinct roots
(ii) $C > 0 \rightarrow$ Roots of the same sign
(iii) $\frac{-b}{2a} < 0 \rightarrow$ Both roots negative

From condition (i)

$(-2a + 9)^2 - 4.1.(a^2 - 11a + 10) > 0$

$a > -\frac{41}{8}$

From (ii) $\quad a^2 - 11a + 10 > 0$

$a \in (-\infty, +1) \cup (10, \infty)$

From (iii) $\quad -2a + 9 > 0$

$a < \frac{9}{2}$

Combining all three $\rightarrow a \in \left(-\frac{41}{8}, 1\right)$

6 integral values of $\rightarrow -5, -4, -3, -2, -1, 0$

39. **(B)**

Use $\tan 2\theta = \frac{2+\tan\theta}{1+\tan^2\theta}$

$\tan 15^o = 2-\sqrt{3}$

$2-\sqrt{3} = \frac{2\tan 7.5^o}{1-\tan^2 7.5^o}$

Quadratic in $\tan 7.5^o$ solving will give $\rightarrow$

$\tan 7.5^o = \left(-1+\sqrt{1+\left(2-\sqrt{3}\right)^2}\right)\left(2+\sqrt{3}\right)$

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

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

$= -2-\sqrt{3}+2\sqrt{2+\sqrt{3}}$

$=-2-\sqrt{3}+\sqrt{8+2\sqrt{3}}$

$=-2-\sqrt{3}+\sqrt{\left(\sqrt{6}\right)^2+\left(\sqrt{2}\right)^2+2.\sqrt{6}.\sqrt{2}}$

$=\sqrt{6}+\sqrt{2}-2-\sqrt{3}$

40. **(A)**

Centre of the circle = (x, y)

$OA = \sqrt{\left(-2-x\right)^2+\left(-3-y\right)^2}$

$OB = \sqrt{\left(-1-x\right)^2+\left(0-y\right)^2}$

$OC = \sqrt{\left(7-x\right)^2+\left(-6-y\right)^2}$

Make two linear equations in two variables by using OA = OB , OB = OC

Solving the equations will give (3, -3)

41. **(B)**

Front wheel Radius = r

Back wheel Radius = R

$2\pi r = 30$

$2\pi R = 36 \qquad \Rightarrow \frac{r}{R} = \frac{5}{6}$

Distance travelled = $2\pi\left(x+5\right)r = xR\times 2\pi$

$\left(x+5\right)\frac{5R}{6} = xR$

$5x+25 = 6x$

x = 25

Distance travelled = $25\times\left(2\pi R\right)$

= 25×36

= 900 ft

42. **(C)**

Probability of getting a total of 2 is equal to probability of getting a total of 12

Similarly probability of getting a total of x isequal to probability of getting a total of 14 – x

Probability of getting 7 = $\{(1,6),(2,5),(3,4),(4,3),(5,2),(6,1)\}$

So, $\text{prob.}(2)+\text{prob}(3).....+\text{prob.}(7)+\text{prob.}(8).....+\text{prob.}(12)=1$

$\text{prob.}(12)+\text{prob.}(11)....+\text{prob.}(7)+\text{prob.}(8).....+\text{prob}(12)=1$

$\text{prob.}(7)+2(\text{prob.}(8)+\text{prob.}(12))=1$

$\frac{6}{36}+2p=1$

$2p=1-\frac{6}{36}=\frac{30}{36}$

$p=\frac{15}{36}=\frac{5}{12}$

43. **(B)**

$\text{median}=\frac{-x^2+2x+23+2x^2-3x+21}{2}$

$x^2-x+44=50$

$x^2-x-6=0$

$x=3,-2$

For $x=3,\quad T_5=20,\quad T_6=30$

$x=-2,\quad T_5=15,\ T_6=35$ X (not in ascending order)

x = 3

44. **(D)**

Recurring Decimals can be written in fraction form and $\frac{22}{7}$ is rational.

45. **(A)**

Sum = x

$\text{C.I.}=\left[x\left[1+\frac{4}{100}\right]^2-x\right]=\frac{676x}{625}-x=\frac{51}{625}x$

$\text{S.I.}=\frac{x\times4\times2}{100}=\frac{2x}{25}$

$\frac{51x}{625}-\frac{2x}{25}=1\Rightarrow x=625$

46. **(D)**

$\sqrt{11+2\sqrt{30}}=\sqrt{(\sqrt{6})^2+(\sqrt{5})^2+2.\sqrt{6}.\sqrt{5}}$

$=\sqrt{6}+\sqrt{5}$

$(\sqrt{6}-\sqrt{5})(\sqrt{6}+\sqrt{5})=1$

$\sqrt{4+2\sqrt{3}}=\sqrt{(\sqrt{3})^2+(1)^2+2.\sqrt{3}}=\sqrt{3}+1$

So, x = 5

47. **(B)**

5 = 2 + 3
12 = 5 + 7
24 = 11 + 13
36 = 17 + 19
52 = 23 + 29
Sum of consecutive prime numbers.

48. **(C)**

x % of y = $\frac{xy}{100}$ = A

y % of x = $\frac{yx}{100}$ = B

49. **(A)**

$\left(x^2-1\right)^2 \qquad x = 0, 1, 2, 3, 4, 5$

50. **(B)**

Area of square = $4r^2$ (r is the radius)

Area of one quarter of circle = $\frac{\pi \times r^2}{4}$

Area of 4 quarters = $4\times\frac{\pi r^2}{4} = \pi r^2$

Enclosed area = $4r^2 - \pi r^2$

$= (4-\pi)r^2 = \left(4-\frac{22}{7}\right)r^2$

$= \frac{6}{7}r^2$

$\frac{6}{7}r^2 = \frac{24}{7} \Rightarrow r^2 = 4 \Rightarrow r = 2\text{cm}$