ACE OF PACE

MAIN (CODE - 11) **ANSWERS KEY** **DATE: 06/01/2019**

Question	Answer	Question	Answer
1	C	21	C
2	A	22	B
3	C	23	D
4	C	24	C
5	D	25	B
6	A	26	C
7	D	27	D
8	B	28	D
9	C	29	C
10	B	30	D
11	C	31	D
12	B	32	C
13	B	33	C
14	C	34	B
15	B	35	C
16	D		
17	C		
18	D		
19	C		
20	D		

ACE OF PACE OBJECTIVE SECTION
(SOLUTION)

1. **(C)**

Let a and b be the required numbers

We have

$a+b=55$

$ab = HCF \times LCM = 5\times 120 = 600$

Required sum = $\frac{1}{a}+\frac{1}{b}=\frac{a+b}{ab}=\frac{55}{600}=\frac{11}{120}$

2. **(A)**

$$\frac{1}{P}=\frac{1}{7-4\sqrt{3}}=\frac{7+4\sqrt{3}}{49-48}=7+4\sqrt{3}$$

$$P+\frac{1}{P}=\frac{P^2+1}{P}=7-4\sqrt{3}+7+4\sqrt{3}=14$$

$$\Rightarrow \quad \frac{P^2+1}{7P}=2$$

3. **(C)**

$x^2+y^2-3xy=0 \Rightarrow (x-y)^2=xy$

$\Rightarrow \quad x-y=\sqrt{xy}$

$\therefore \quad \log_{xy}(x-y)=\log_{xy}\sqrt{xy}=\frac{1}{2}$

4. **(C)**

$\log_6 x+\frac{2}{2}\log_6 x+\frac{3}{3}\log_6 x=9.$

$\Rightarrow \quad 3\log_6 x=9 \quad \Rightarrow \quad \log_6 x=3 \quad \Rightarrow \quad x=6^3=216$

5. **(D)**

Let present ages of person and his son be x years and y years respectively

Using information provided we have

$x-4=3(y-4)$

$\Rightarrow \quad x-3y=-8$ _____(I)

Also $x+8=2(y+8)$

$\Rightarrow \quad x-2y=8$ _____(II)

Solving (I) and (II) we get x = 40, y = 16.

$\therefore$ Required sum = 56

6. **(A)**

Let speed of cars starting from A and B be x km/hr and y km/hr respectively. According to the problem we have

$9x-9y=90 \Rightarrow x-y=10$ _____(i)

Also $\frac{9}{7}x+\frac{9}{7}y=90\Rightarrow x+y=70$ _____(ii)

Solving (i) and (ii) we get

$x=40\text{km/hr}$

$y=30\text{km/hr}$

$\therefore$ Speed of fastest car is 40km/hr

7. (D)

Clearly x = 1 satisfies the given equation

$\therefore x=1$ is a root

$\because$ roots are equal

$\Rightarrow$ product of roots $=1\Rightarrow\frac{c-a}{a-b}=1\Rightarrow b+c=2a$

8. (B)

Let speed of water flow be x km/hr.

Then, speed of boat going downstream = (9 + x) km/hr

And speed while going upstream = (9 – x) km/hr

Thus., $\frac{15}{9+x}+\frac{15}{9-x}=3\frac{3}{4}=\frac{15}{4}$

$\Rightarrow \quad 81-x^2=72\Rightarrow x=3$

9. (C)

n(A) should be a factor of $n(A\times B)$

$\therefore \quad n(A)\neq 17$

10. (B)

Let total no. of students = x

$\therefore \quad 0.8x-0.4x=40\Rightarrow x=100$

11. (C)

$\because \quad r=p^2-q^2=(p+q)(p-q)$

$\because$ r is a prime No. $\Rightarrow \quad p-q=1$ and $p+q=r$

$\Rightarrow \quad p=3,\ q=2,\ r=5$

$\therefore \quad p+q+r=10$

12. (B)

Mean of remaining data = $\frac{12\times 15-(20+25)}{10}$

= 13.5

13. (B)

If August starts with Tuesday it will have 5 Tuesday out of 31 days

$P(\text{not a Tuesday})=\frac{26}{31}$

14. (C)

$AE=BE=x$ and $BD=DC=y$

In ΔABD $\quad AB^2 + BD^2 = AD^2$

$\Rightarrow \quad 4x^2 + y^2 = 292 \quad$ ____(i)

In ΔBCE $\quad EB^2 + BC^2 = CE^2$

$\Rightarrow \quad x^2 + 4y^2 = 208 \quad$ ___(ii)

(i) + (ii) $\quad 5\left(x^2 + y^2\right) = 500 \Rightarrow x^2 + y^2 = 100$

$\therefore \quad AC = \sqrt{4\left(x^2 + y^2\right)} = \sqrt{400} = 20$

15. (B)

$\angle CDF = 70^o \qquad \angle BFE = 100^o$

$\Rightarrow \quad \angle CBF = 30^o$

As in ΔBFD

$\angle CDF + \angle CBF = \angle BFE$

Also $\angle ABC = \angle CDF = 70^o$

$\Rightarrow \quad \angle ABG = 40^o$

16. (D)

16 years ago, Let Tanya's age = x years and her grandfather's age = 8x.

After 8 years from now

$T = \left(x + 24\right)$

and $\quad G = 8x + 24$

$\therefore \quad 8x + 24 = 3\left(x + 24\right)$

$\Rightarrow \quad 5x = 48$

or $\quad x = \dfrac{48}{5}$

Years age, $\dfrac{T}{G} = \dfrac{x+8}{8x+8} = \dfrac{11}{53}$

17. (C)

$x = a + b + c$ satisfies the given equation

18. (D)

$a + b + c = 0$

$\Rightarrow \quad b + c - a;$ squaring both sides

$\therefore \quad b^2 + c^2 + 2bc = a^2$

Or $\quad b^2 + c^2 - a^2 = -2bc$

Similarly $c^2 + a^2 - b^2 = -2ca$

And $a^2 + b^2 - c^2 = -2ab$

$\therefore$ Given expression $= -\dfrac{1}{2}\left[\dfrac{1}{bc} + \dfrac{1}{ca} + \dfrac{1}{ab}\right]$

$= -\dfrac{1}{2}\left(\dfrac{a+b+c}{abc}\right)$

$-\dfrac{1}{2abc} \times 0 = 0$

$\left[\therefore (a+b+c)=0\right]$

19. (C)

$$\frac{a}{b+c}=\frac{b}{c+a}=\frac{c}{a+b}$$

Each term is equal to $\frac{a+b+c}{2(a+b+c)}$

If $(a+b+c)\neq 0,$ then each term is $\frac{1}{2}$

If $a+b+c=0$, then each term $\frac{a}{b+c}=\frac{a}{-a}=-1$

20. (D)

$\sin A=\sin B=\sin C=1$

$\because \quad -1\le \sin\theta\le 1$

$\Rightarrow \quad A=B=C=\frac{\pi}{2}$

$\therefore \quad \cos A+\cos B+\cos C=0$

21. (C)

Given Expression

$$\Rightarrow \quad \sin x\left[\frac{(1-\cos x)+(1+\cos x)}{1-\cos^2 x}\right]=4$$

$$\Rightarrow \quad \sin x\times\frac{2}{\sin^2 x}=4 \qquad \text{or} \qquad \sin x=\frac{1}{2}$$

$\Rightarrow \quad x=30^{o}$

22. (B)

In a cyclic quadrilateral, opposite angles are supplement of each other.

$\therefore \quad A+C=180^{o}$ and $B+D=180^{o}$

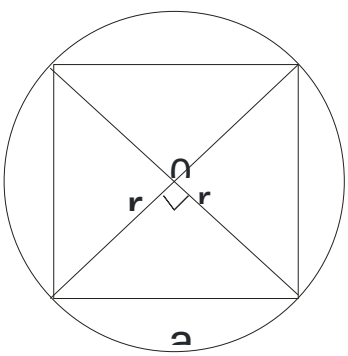
$$\therefore \quad K=\frac{\cos A+\cos B}{\cos C+\cos D}$$

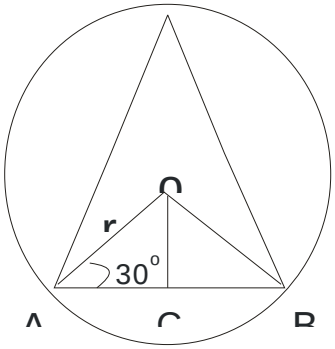
$$=\frac{\cos(180^{o}-C)+\cos(180^{o}-D)}{\cos C+\cos D}$$

$$=\frac{-\cos C-\cos D}{\cos C+\cos D}=-1$$

23. (D)

We have to express the radius of the circle in terms of a and b





$a^2 = r^2 + r^2$

$= 2r^2$

$\Rightarrow \quad r^2 = \frac{a^2}{2}$ _____(i)

$\frac{AC}{r} = \cos 30^o \Rightarrow \frac{b}{2}.\frac{1}{r} = \frac{\sqrt{3}}{2}$

$\therefore \quad r = \frac{b}{\sqrt{3}}$ or $r^2 = \frac{b^2}{3}$ _____(ii)

From (i) and (ii) , we have

$\frac{a^2}{2} = \frac{b^2}{3} \Rightarrow 3a^2 = 2b^2$

24. (C)

Let the sides be 2x and 3x.

Then area of trapezium = 275cm^2 or $\frac{1}{2}(2x+3x)\times 5 = 275$

$\Rightarrow \quad x = 22$

$\therefore$ smaller of the parallel sides = 2x = 44 cm

25. (B)

Volume Ratio = 1:8

Radii ratio = $(1)^{1/3} : (8)^{1/3} = 1:2$

Surface area ratio = 1 : 4

26. (C)

$$\frac{4}{\sqrt{10-2\sqrt{21}}} = \frac{4}{\sqrt{\left(\sqrt{7}\right)^2 + \left(\sqrt{3}\right)^2 - 2\sqrt{7\times 3}}} =$$

$$= \frac{4}{\sqrt{\left(\sqrt{7}-\sqrt{3}\right)^2}} = \frac{4}{\sqrt{7}-\sqrt{3}}$$

$$= \frac{4\left(\sqrt{7}+\sqrt{3}\right)}{\left(\sqrt{7}-\sqrt{3}\right)\left(\sqrt{7}+\sqrt{3}\right)}$$

$$= \frac{4\left(\sqrt{7}+\sqrt{3}\right)}{4} = \sqrt{7}+\sqrt{3}$$

27. (D)

$x = \log_3 27$	$y = \log_9 27$
$\Rightarrow x = \log_3 3^3$	$y = \log_{3^2} 3^3$
$\Rightarrow x = 3$	$y = \frac{3}{2}$

$$\therefore \frac{1}{x}+\frac{1}{y} = \frac{1}{3}+\frac{1}{\left(\frac{3}{2}\right)} = \frac{1}{3}+\frac{2}{3} = \frac{3}{3} = 1$$

28. (D)

(i) Use remainder theorem

(ii) put x = 0, x = -1, and x = -2 in the given expression, and obtain the corresponding remainders.

29. (C)

$$\left(4a+5b+5c\right)^2-\left(5a+4b+4c\right)^2+9a^2$$

$$= \left(4a+5b+5c+5a+4b+4c\right)$$

$$\left(4a+5b+5c-5a-4b-4c\right)+9a^2$$

$$= \left(9a+9b+9c\right)\left(-a+b+c\right)+9a^2$$

$$= 9\left(a+b+c\right)\left(-a+b+c\right)+9a^2$$

$$= 9\left(b+c\right)^2-9a^2+9a^2$$

$$= 9\left(b+c\right)^2$$

$\therefore$ The square root of the given expression is $\sqrt{9\left(b+c\right)^2} = 3\left(b+c\right)$

30. (D)

Let the amounts with Amar and Bhavan be Rs A and Rs B respectively.

$$\left(B-20\right) = \frac{1}{2}\left(A+20\right) \text{ and } A-40 = \frac{1}{2}\left(B+40\right)$$

$$2B-40-20 = A \text{ and } A = \frac{1}{2}B+20+40$$

$$\therefore A = 2B-60 = \frac{1}{2}B+60$$

$$\frac{3B}{2} = 120 \Rightarrow B = 80$$

31. (D)

Let the number of questions attempted correctly by the candidate = C

He attempted all the questions.

$\therefore$ Number of questions attempted wrongly by him = 60 – C

$$2C-1\left(60-C\right) = 90$$

$$2C-60+C = 90$$

$$C = 50$$

32. (C)

Let the speed of Ramu = x km/h

Total time taken is = 1h

i.e., $\frac{3}{x-4}+\frac{3}{x+4}=1$

$$\frac{3x+12+3x-12}{x^2-16}=1$$

$6x = x^2-16$

$x^2-6x-16=0$

$x^2-8x+2x-16=0$

$x(x-8)+2(x-8)=0$

$(x-8)(x+2)=0$

$x=8$ kmph ($\because$ speed cannot be -2 kmph)

33. (C)

As p, q and 2p are in descending order, their median is q.

$\therefore q=36$

$\frac{p+q+2p}{3}=31$

$\Rightarrow \quad 3p+36=93 \Rightarrow p=19$

$\therefore$ mean of 19 and 36 = $\frac{19+36}{2}=27.5$

34. (B)

Given that, $\frac{\text{mean}}{\text{median}}=\frac{5}{7}$

We know that mode = 3 median – 2 mean.

$\text{mode} = \text{mean}\left(\frac{3\,\text{median}}{\text{mean}}-2\right)$

$\frac{\text{mode}}{\text{mean}}=\left(3.\frac{7}{5}-2\right)=\frac{21-10}{5}=\frac{11}{5}$

35. (C)

Let the number be $x.100 \le x \le 399$.

A number ending with a 0 is divisible by 10.

Least value of x, divisible by 10 = 100 = 10(10).

Greatest value of x, divisible by 10 = 390 = 10(39)

Number of values of x divisible by 10

Number of numbers from 10 to 39 = 30

Required probability = $\frac{30}{300}=\frac{1}{10}$