ACE OF PACE

MAIN (CODE: 11) **ANSWERS KEY** **DATE: 22/04/2018**

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

ACE OF PACE

MAIN (CODE: 11) **SOLUTION** **DATE: 22/04/2018**

1. **(B)**

$f(x) = x^5 + 1$

Remainder theorem:

$f(1) = 1 + 1 = 2$ remainder = 2 when divided by $(x - 1)$

$f(-1) = -1 + 1 = 0$ remainder = 0 when divided by $(x + 1)$

2. **(B)**

Let l and b are sides, then

$$\sqrt{l^2 + b^2} + \frac{l}{2} = l + b$$

$$\Rightarrow l^2 + \cancel{b^2} = \frac{l^2}{4} + \cancel{b^2} + lb$$

$$\Rightarrow 3\frac{l^2}{4} = lb \Rightarrow \frac{l}{b} = \frac{4}{3}$$

3. **(D)**

$-1 \le \cos\theta, \sin\theta \le 1 \ \forall\theta$

$\sec\theta \ge 1 \ \ \forall\theta$

$\tan\theta \in R$

4. **(C)**

$y = ax^2 + bx + c$ is parabola

5. **(A)**

Let no be xy

Then $7(10x + y) = 4(10y + x)$

$\Rightarrow \quad 66x = 33y$

$2x = y$

$x + y = 3$

6. **(C)**

$(x - a)(x - b) + c = 0$

$x + B = a + b$ ….. (1)

$xB = ab + c \Rightarrow xB - c = ab$ ….. (2)

and $(x-\alpha)(x-\beta) - c = 0$

$\alpha^1 + \beta^1 = \propto + \beta$ ….. (3)

$\alpha^1\beta^1 + \beta^1 = \alpha\beta - c$ ….. (4)

Compare 1 and 2 with 3 and 4

$\Rightarrow$ roots are a and b

7. **(D)**

$\sec^2\theta - \tan^2\theta = 1$

$\Rightarrow$ (sec *A* – tan *A*) (sec *A* + tan *A*) (sec *B* – tan *B*) (sec *B* + tan *B*)
(sec *C* – tan *C*) (sec *C* + tan *C*) = 1

Or (sec *A* – tan *A*) (sec *B* – tan *B*) (sec *C* – tan *C*) $= \pm 1$

8. **(B)**

Total cards: 13 clubs
4 aces
(–1) for one repeated ace of clubs

$\Rightarrow$ Probability $= \dfrac{13+4-1}{52} = \dfrac{4}{13}$

9. **(C)**

Clearly L_1 is coincident with L_2

$L_3 \equiv L_1 + L_2 \Rightarrow a_1x + b_1y + c_1 + ka_1x + kb_1y + kc_1 = 0$

$\Rightarrow a_1x + b_1y + c_1 = 0 = L_1$

$\Rightarrow L_3$ coincident with L_1 *and* L_2

10. **(D)**

(i) $\dfrac{a_1}{a_2} \neq \dfrac{b_1}{b_2} \Rightarrow$ unique solutions

(ii) $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} \neq \dfrac{c_1}{c_2} \Rightarrow$ no solution

(iii) $\dfrac{a_1}{a_2} = \dfrac{b_1}{b_2} = \dfrac{c_1}{c_2} \Rightarrow$ coincident lines $\Rightarrow$ infinites solution

11. **(D)**

Total frequency = 4 + 5 + 7 + 9 + 7 + 6 = 38
Median will be mean 19^{th} to 20^{th}.
$\Rightarrow$ 8 is median

12. **(A)**

$\sin A = \cos\left[90 - (A - 20)\right]$

$\Rightarrow A = 110 - A$ *or* $A = 55^0$

13. **(B)**

$\pi R_1^2 + \pi R_2^2 = \pi R^2$

$\Rightarrow R_1^2 + R_2^2 = R^2$

14. **(B)**

Sum of roots $= \dfrac{1}{2}$

$\Rightarrow \dfrac{1}{4} + \propto = \dfrac{1}{2}$

or $\propto = \dfrac{1}{4}$, hence other root $= \dfrac{1}{4}$

15. **(D)**

Clearly LCM of 78 and 13 is 78, and *GCD* is 13.
and LCM of 26 and 39 is 78, and *GCD* is 13.

16. **(C)**

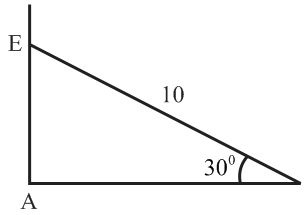
Distance travelled along circumference will be equal

$\Rightarrow n_1 \times r_1 = n_2 \times r_2$

$\Rightarrow 15 \times 25 = n_2 \times 15$

$\Rightarrow n_2 = 25$ *revolution*

17. **(B)**



$AE = 10 \sin 30^0$

$= 5$

18. **(D)**

Sure event $\Rightarrow P = 1$

Impossible event $\Rightarrow P = 0$

For complementary event $P(A) + P(B) = 1$

19. **(B)**

$$\text{Amount of water} = 1.5 \times 36 \times 3.5 \times \frac{5}{18} \times 60 \quad m^3/\text{min}$$

$= 3150$

20. **(B)**

$2\pi r = 4a$

$\Rightarrow \pi r = 2a \Rightarrow \pi^2 r^2 = 4a^2$

Hence, $\pi r^2 > a^2$

21. **(D)**

LCM of 66, 88 and 110 is 22.
No. of rows of apple trees = 3
No. of rows of banana trees = 4
No. of rows of mango trees = 5
Total = 12 rows

22. **(D)**

Rahul = x

Then, $2x^2 - 25x = 42$

$\Rightarrow \quad x = 14$

23. **(A)**

Sailor = x, water = y

Then $\frac{8}{x+y}=\frac{2}{3}$ *and* $\frac{8}{x-y}=1$

$\Rightarrow x=10,=2$

24. (B)

Let l and b is dimension

Then $2b + l = 30$

$4\ lb = 100$

$\Rightarrow l=b=10 \quad or \quad l=20, b=5$

25. (B)

$\frac{1}{2}=10000\times t$

$\Rightarrow t=\frac{1}{20000}m$ or 0.005 cm

26. (C)

Let capital = x

Then $\frac{8x}{100}-\frac{7.75x}{100}=61.5$

Or $x = 24600$

27. (D)

Let no. = n

$\Rightarrow n\times\frac{4}{3}\pi\times\left(\frac{3}{10}\right)^3=9\times11\times12$

$\Rightarrow n=84000$

28. (B)

Let the ratio be k : 1

$\Rightarrow \frac{7.2\times k+6.7}{k+1}=6.9$

$\Rightarrow 7.2k+6.7=6.9k+6.9$

or $3k = 2$

$k=\frac{2}{3}$

29. (B)

After half year

Interest $=1600\times\frac{2.5}{100}=40$ Rs.

For market half, P = 1600 + 40 + 1600 = 3240

Interest $=3240\times\frac{2.5}{100}=81$ Rs.

Interest = 40 + 81

= 121 Rs.

30. (D)

New area $=\frac{4}{5}l\times\frac{9}{10}b$

$= \frac{36}{50} lb = \frac{72}{100} lb$

% reduction = 28%

31. (B)

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2} \Rightarrow \frac{2}{k} \pm \frac{-3}{5}$ *or* $k \pm \frac{-10}{3}$

32. (B)

$\frac{7\times10+30\times P+50\times10+9\times70+13\times90}{7+P+10+9+13} = 54$

$\Rightarrow P = 11$

33. (D)

H.C.F. if 210 and 55 = 5

$\Rightarrow 5 = 210\times5+55y$ *or* $1 = 210+11y$

$\Rightarrow y = -19$

34. (D)

$a - d, a, a + d$

$\Rightarrow 3a = -3$ *or* $a = -1$

$-1 - d, -1, -1 + d$

$\Rightarrow (1-d^2)(-1) = 8 \Rightarrow d = \pm 3$

Numbers = 2, – 1, – 4 or – 4, – 1, 2

35. (C)

$\frac{4}{3}\pi \times 9^3 = \pi \times \left(\frac{2}{10}\right)^2 \times h$

$\Rightarrow h = 24300\, cm = 243\, m$

36. (A)

$3D + 2d = 32$

$4D + 3d = 44$

$\Rightarrow D = 8, d = 4$

Hence, $2D + d = 20$ kg

37. (B)

Primer numbers: 2, 3, 5, 7, 11, 13, 17, 19, 23

Probability $= \frac{9}{25}$

38. (C)

Distance = d

Priya speed $= \frac{d}{18}$,

Ravish speed $= \frac{d}{12}$

Relatin speed $= \frac{d}{12} - \frac{d}{18} = \frac{d}{36}$

$$\frac{d}{36}\times t = d \Rightarrow t = 36\,\text{min}$$

39. (B)

Composite no can be expressed as unique prime factors

40. (B)

Upward opening $\Rightarrow a > 0$

Sum of roots > 0 $\Rightarrow -\frac{b}{a} > 0 \Rightarrow b < 0$

Product of roots < 0 $\Rightarrow \frac{c}{a} < 0 \Rightarrow b < 0$

41. (D)

$\angle A + 95^\circ + \angle C + 32^\circ = 360^\circ$

$\Rightarrow \angle A + \angle C = 233^\circ$

42. (D)

Divide by 2^{n+2}

$\Rightarrow \frac{8-1}{16-2} = \frac{1}{2}$

43. (C)

Remainder = $P(-2) = (-2)^2 + (-2)^3 + (-2)^2 + 2(-2) + 3$

$= -5$

44. (A)

Any point on x axis $= (\lambda, 0)$

Ordinate = 0

45. (C)

Exterior angle is equal to sum of interior opposite angles

$\Rightarrow x = 60 + 25 = 85^\circ$

46. (D)

Lateral surface area $= \pi rl$

$= \pi \times 5 \times \sqrt{5^2 + 8^2}$

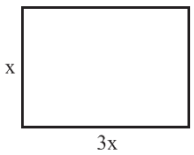
$= 5\pi\sqrt{89}\ cm^2$

47. (A)

$3x - 3 = x + 3$

$\Rightarrow x = 3$

Dimension are 3, 3×3 or 3, 9



48. (D)

Area of trapezium $= \frac{1}{2}\times 30 \times (70 + 110) = 2700\ cm^2$

Required wood $= 2700 \times 30 = 81000\ cm^2$

49. (D)

Polynomial in x is

$a_0x^n + a_1x^{n-1} + a_2x^{n-2} + a_3x^{n-3}$

a_i's $\in R$ 4 power of x are whole numbers.

50. (A)

In mode, frequency of 4 should be maximum $\Rightarrow least \times = 6$

If $\dfrac{3\times0+2\times1+3\times2+5\times3+4x+1\times5}{3+2+3+5+x+1} = \dfrac{9}{4}$

$\Rightarrow \quad x = 2$