Pinnacle Learning Destination
Plot No.3 Third Floor Main Road
Raghunathpur, Sector 22 -Noida,
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Pin-201301Ph-+91-9555662244

Twisted Quant for IBPS Exams

Q1. If $x = (16^3 + 17^3 + 18^3 + 19^3)$,
then x divided by 70 leaves a remainder of:

(a) 0

(b) 1

(c) 69

(d) 35

(e) None of these

S1. Ans.(a)
Sol. $\frac{a^n + b^n}{a + b}$ is divisible for all the odd values of n.
Hence, option (a) is the answer.

Q2. A chemical plant has four tanks (A, B, C and D), each containing 1000 litres of a chemical. The chemical is being pumped from one tank to another as follows.

From A to B @ 20 litres/min

From C to A @ 90 litres/min

From A to D @ 10 litres/min

From C to D @ 50 litres/min

From B to C @ 100 litres/min

From D to B @ 110 litres/min

Which tanks gets emptied first, and how long does it take (in minutes) to get empty after pumping starts?

(a) A, 16.66

(b) C, 20

(c) D, 20

(d) D, 25

(e) None of these

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S2. Ans.(c)

Sol.

A	B	C	D
-20	20		
90		-90	
-10			10
		-50	50
	-100	100	
	110		-110
Total+60	30	-40	-50

From the table, D tank will get emptied first in (1000/50) = 20 minutes

Q3. A jogging park has two identical circular tracks touching each other, and a rectangular track enclosing the two circles. The edges of the rectangles are tangential to the circles. Two friends, A and B, start jogging simultaneously from the point where one of the circular tracks touches the smaller side of the rectangular track. A jogs along the rectangular track, while B jogs along the two circular tracks in a figure of eight. Approximately, how much faster than A does B have to run, so that they take the same time to return to their starting point?

(a) 3.88 per cent

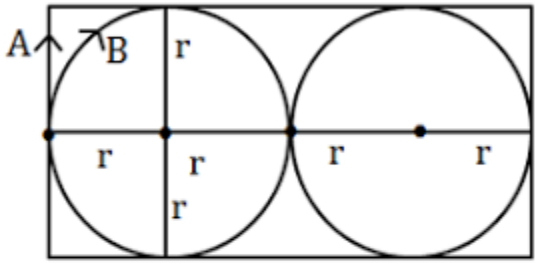
(b) 4.22 per cent

(c) 4.44 per cent

(d) 4.76 per cent

(e) None of these

S3. Ans.(d)
Sol.



A covers $2r + 2r + 4r + 4r = 12r$
B covers $2\pi r + 2\pi r = 4\pi r$ distance
$\frac{4\pi r}{S_B} = \frac{12r}{S_A} \Rightarrow S_B = \frac{\pi}{3} S_A$
$\frac{S_B - S_A}{S_A} \times 100 = \frac{\pi - 3}{3} 100 = 4.76$ per cent

Q4. In a chess competition involving some boys and girls of a school, every student had to play exactly one game with every other student. It was found that in 45 games both the players were girls, and in 190 games both were boys. The number of games in which one player was a boy and the other was a girls is

(a) 200
(b) 216
(c) 235
(d) 256
(e) None of these

S4. Ans.(a)
Sol. Let there be m boys and n girls
${}^nC_2 = 45 \Rightarrow n(n - 1) = 90 \Rightarrow n = 10$
${}^mC_2 = 190 \Rightarrow \frac{m(m-1)}{2} = 190 \Rightarrow m(m - 1) = 380$
$\Rightarrow m = 20$
Number of games between one boy and one girl
$= {}^{10}C_1 \times {}^{20}C_1 = 10 \times 20 = 200$
Hence, option (a) is the answer.

Directions (5-6): Answer the questions on the basis of the information given below:

Ram and Shyam run a race between points A and B, 5 km apart Ram starts at 9 am from A at speed of 5 km/h, reaches B, and returns to A at the same speed, Shyam starts at 9.45 am from A at a speed of 10 km/h, reaches B and come back to A at the same speed.

Q5. At what time do Ram and Shyam first meet each other?

(a) 10 am

(b) 10.10 am

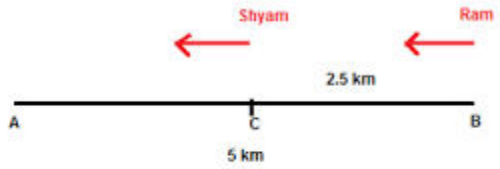
(c) 10.20 am

(d) 10.30 am

(e) None of these

S5. Ans.(b)

Sol. Obvious Ram and Shyam shall meet each other between C and B, sometime after 10:00 am. At 10:00 am they are moving as shown below:



From now, time taken to meet $= \frac{2.5}{(10+5)} \times 60 \text{ min} = 10 \text{ minutes}.$

So, they meet each other at 10:10 am

Q6. At what time does Shyam over take Ram?

(a) 10.20 am

(b) 10.30 am

(c) 10.40 am

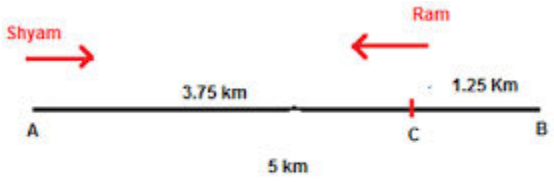
(d) 10.30 am

(e) None of these

S6. Ans.(b)

Sol. Obvious form the diagram that at 10:30, Shyam over takes Ram

Alternate: At 10:15 the situation is as shown:



Time taken for Shyam to overtake Ram $= \frac{3.75}{(10+5)} \times 60 = 15$ min.

Shyam overtakes Ram at 10:30 am.

Directions (7-8): Answer the questions independently of each other.

Q7. If $R = \frac{30^{65} - 29^{65}}{30^{64} + 29^{64}}$, then

(a) $0 < R \leq 0.1$

(b) $0.1 < R \leq 0.5$

(c) $0.5 < R \leq 1.0$

(d) $R > 1$

(e) None of these

S7. Ans.(c)

Sol.

$$\frac{30^{65} - (30-1)^{65}}{30^{64} + (30-1)^{64}}$$

$$= \frac{30^{65} - 30^{65}\left(1 - \frac{1}{30^{65}}\right)}{30^{64} + 30^{64}\left(1 - \frac{1}{30^{64}}\right)}$$

$$\text{Or } R = 30\left\{\frac{\left(1 - \left(1 - \frac{1}{30}\right)^{65}\right)}{\left(1 + \left(1 - \frac{1}{30}\right)^{64}\right)}\right\}$$

$$R = 30\left\{\frac{1 - (0.96)^{65}}{1 + (0.96)^{64}}\right\}$$

Numerator is only slightly less than 1 and denominator is only slightly more than 1. R is slightly less than 1.

Q8. For which value of k does the following pair of equations yield a unique solution of x such that the solution is positive?

$x^2 - y^2 = 0$ and $(x - k)^2 + y^2 = 1$

(a) 2

(b) 0

(c) $\sqrt{2}$

(d) -2

(e) None of these

S8. Ans.(c)

Sol. $y^2 = x^2$

$2x^2 - 2kx + k^2 - 1 = 0$

$D = 0$

$\Rightarrow 4k^2 = 8k^2 - 8$

$\Rightarrow 4k^2 = 8$

$k^2 = 2$

$k^2 = 2 \Rightarrow k = \pm\sqrt{2}$ with $k = \pm\sqrt{2}$

the equation is $2x^2 + 2\sqrt{2}x + 1 = 0$ roots is:

$\frac{-b}{2a} = +\frac{1}{\sqrt{2}}$ but with $k = -\sqrt{2}$, the equation is $-\frac{1}{\sqrt{2}}$

As this root is -ve will reject $k = -\sqrt{2}$, only answer is:

$\Rightarrow k = +\sqrt{2}$ only.

Q9. The digits of a three-digit number of A are written in the reverse order to form another three-digit number B. If B > A and B-A is perfectly divisibly by 7, then which of the following is necessarily true?

(a) 100 < A < 299

(b) 107 < A < 300

(c) 112 < A < 311

(d) 118 < A < 317

(e) None of these

S9. Ans.(b)

Sol. Let A = abc, then B = cba

Given B > A which implies c > a …(i)

As B - A = (100c + 10b + a) - (100a +10b + c)

B - A = 100 (c - a) + (a - c)

B - A = 99 (c - a) and (B - A) is divisible by 7; and 99 is not divisible by 7 (no factor like 7 or 7^2) therefore, (c - a) must be divisible by i.e. (c - a) must be 7, 7^2, etc.) as c and a are single digits (c - a) must be 7 only, the

possible values (c, a) {with c > a} are (2) and (8, 1) with this we can write A as A: abc = 1b 8 or 2b 9.

As b can take values from 0 to 9, the smallest and largest possible values of A are:

A_min=108

And A_max=299

Only option (b) satisfies. So, option (b) is the answer.

Q10. For a positive integer n, let p_n, denote the product of the digits of n and S_n, denote the sum of digits of n. The number of integers between 10 and 1000 for which $p_n + s_n = n$ is

(a) 81

(b) 16

(c) 18

(d) 9

(e) None of these

S10. Ans.(d)

Sol. $10 < n < 1000$

Let n is two digit number

$n = 10a + b \Rightarrow p_n = ab, s_n = a + b$

Then $ab + a + b = 10a + b$

$\Rightarrow ab = 9a \Rightarrow b = 9$

There are 9 such numbers 19, 29, 33, ... 99

Then, let n is three digit number

$\Rightarrow n = 100a + 10b + c \Rightarrow p_n = abc, s_n = a + b + c$

Then, $ab + a + b + c = 100a + 10b + c$

$\Rightarrow abc = 99a + 9b$

$\Rightarrow bc = 99 + 9\frac{b}{a}$

But the minimum value for bc = 81 (i.e. when both b and c are 9)

And RHS is more than 99. Hence no such number is possible.

Hence, option (d) is the answer.

Q11. Let S be a set of positive integers such that every element n of S satisfies the conditions:

I. 1000 <= n <= 1200

II. Every digit in n is odd

Then how many element of S are divisibly by 3?

(a) 9

(b) 10

(c) 11

(d) 12

(e) None of these

S11. Ans.(a)

Sol. The 100th and 1000th position value will be only 1.

Now the possibility of unit and tens digits are (1, 3), (1, 9), (3, 1), (5, 5), (7, 3), (7, 9), (9, 1), (9, 7)

Q12. Let $x = \sqrt{4 + \sqrt{4 - \sqrt{4 + \sqrt{4 - \cdots \infty}}}}$, then x equals

(a) 3

(b) $\left(\frac{\sqrt{13}-1}{2}\right)$

(c) $\left(\frac{\sqrt{13}+1}{2}\right)$

(d) $\sqrt{13}$

(e) None of these

S12. Ans.(c)

Sol. $x = \sqrt{4 + \sqrt{4 - x}} \Rightarrow x^2 = 4 + \sqrt{4 - x}$

$(x^2 - 4) = \sqrt{4 - x}$

Now put the values from options. Only 3rd option satisfies the condition

Q13. A telecom service provider engages male and female operators for answering 1000 calls per day. A male operator can handle 40 calls per day whereas a female operator can handle 50 calls per day. The male and the female operators get a fixed wage of Rs 250 and Rs 300 per day respectively. In addition, a male operator gets Rs 15 per call he answers and female operator gets Rs 10 per call she answers. To minimize the total cost, how many male operators should the service provider employ assuming he has to employ more than 7 and maximum 12 number of the females?

(a) 15

(b) 14

(c) 12

(d) 10

(e) None of these

S13. Ans.(d)

Sol. Let us form both equations first:

40m + 50f = 1000

250 m + 300 f + 40 × 15 m + 50 × 10 × f = A

850m + 8000 f = A

When M and F are the number of Males and Females and A is the amount paid by the service provider.

Then the possible values of F are 8, 9, 10, 11, 12

If F = 8, then, M = 15

If F = 9, 10, 11 then M will not be an integer while F = 12 then M will be 10.

By putting F = 8 and M = 15, A = 18800. When F = 12 and M = 10, then A = 18100.

Hence the number of males will be 10.

Q14. Three Englishmen and three Frenchmen work for the same company. Each of them knows a secret not known to others. They need to exchange these secrets over person-to-person phone calls so that eventually each person known all six secrets. None of the Frenchmen knows English, and only one Englishmen knows French. What is the minimum number of phone calls needed for the above purpose?

(a) 5

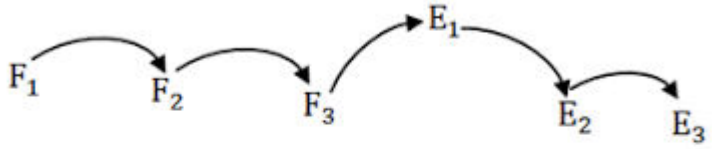
(b) 10

(c) 9

(d) 15

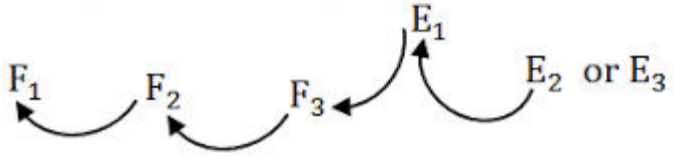
(e) None of these

S14. Ans.(c)
Sol. Frenchmen: F_1, F_2, F_3
Let E_1 knows French 1 round of calls:



Persons	Secrets know after I-round
F_1	F_1, F_2
F_2	F_1, F_2, F_3
F_3	F_1, F_2, F_3, F_4
E_1	F_1, F_2, F_3, E_2
E_2	$F_1, F_2, F_3, E_1, E_2, E_3$ – all known
E_3	$F_1, F_2, F_3, E_1, E_2, E_3$ – all known

In the 6th call E_1 knows all the secrets.
Similarly, after 9th, call everybody know all secrets.



Q15. A rectangular floor is fully covered with square tiles of identical size. The tiles on the edges are white and the tiles in the interior are red. The number of while tiles is the same as the number of red tiles. A possible value of the number of titles along one edge of the floor is

(a) 10
(b) 12
(c) 14
(d) 16
(e) None of these

S15. Ans.(b)
Sol. Let the rectangle has m and n tiles along its length and breadth respectively.
The number of while titles
W = 2 m + 2 (n - 2) = 2(m + n - 2)
And the number of red tiles
R = mn - 2(m + n - 2)
Given
W = R ⇒ 4 (m + n - 2) = mn
⇒ mn - 4m - 4n = -8
⇒ (m - 4) (n - 4) = 8

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As m and n are integers so (m - 4) and (n - 4) are both integers. The possibilities are (m - 4, n - 4) = (1 , 8) or (2, 4) giving, (m, n) as (5, 12) or (6, 8) so the edges can have 5, 12, 6 or 8 tiles. Answer is (b) only.