MEMORY BASED

QUANTITATIVE APTITUDE
IBPS PO PRELIMS 2019

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Direction (1 – 5) Table given below shows total number of people visited park on five different days of week and ratio of male to female. Read the data carefully and answer the questions.

<table>
<thead>
<tr>
<th>Days</th>
<th>Total people visited park</th>
<th>Ratio of male : Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday</td>
<td>640</td>
<td>5 : 3</td>
</tr>
<tr>
<td>Monday</td>
<td>720</td>
<td>11 : 7</td>
</tr>
<tr>
<td>Tuesday</td>
<td>450</td>
<td>5 : 4</td>
</tr>
<tr>
<td>Wednesday</td>
<td>840</td>
<td>7 : 5</td>
</tr>
<tr>
<td>Thursday</td>
<td>480</td>
<td>7 : 9</td>
</tr>
</tbody>
</table>

Q1. Find ratio of total female visited park on Sunday & Monday together to total male visited on Tuesday?
Total female visited park on Sunday & Monday = $640 \times \frac{3}{8} + 720 \times \frac{7}{18} = 240 + 280 = 520$
Total male visited park on Tuesday = $450 \times \frac{5}{9} = 250$
Required ratio = $520 : 250 = 52 : 25$

Q2. Total female visited on Wednesday is what percent more than that of on Tuesday?
Total female visited on Wednesday = $840 \times \frac{5}{12} = 350$
female visited on Tuesday = $450 \times \frac{4}{9} = 200$
Required percentage = $rac{350 - 200}{200} \times 100 = \frac{150}{200} \times 100 = 75\%$

Q3. Find average of males visited park on Monday & Thursday?
Total male visited park on Monday = $720 \times \frac{11}{18} = 440$
Total male visited park on Thursday = $480 \times \frac{7}{16} = 210$
Required average = $\frac{440 + 210}{2} = 325$

Q4. If total female visited park on Friday is 20% more than that of on Wednesday and ratio of male to female visited on Friday is 7 : 9, then find total male visited park on Friday?
Total female visited park on Friday = $840 \times \frac{5}{12} \times \frac{120}{100} = 420$
Total male visited park on Friday = $420 \times \frac{9}{7} = 540$

Q5. Find difference between total male visited park on Sunday and Wednesday?
Total male visited park on Sunday = $640 \times \frac{5}{8} = 400$
Total male visited park on Wednesday = $840 \times \frac{7}{12} = 490$
Required difference = $490 - 400 = 90$

Q6. ‘A’ is 40% less efficient than ‘B’ who can do the same work in 20% less time than ‘C’. If A and B together can complete 80% of work in 12 days, then in how many days 60% of work can be completed by B and C together.

Ratio of efficiency of A and B = 3 : 5
⇒ Time taken be A and B alone to complete the work = 5 : 3
Ratio of time taken by B and C alone to complete the work = 4 : 5
⇒ Ratio of time taken by A, B and C alone to complete the work = 20 : 12 : 15
Let, A, B and C alone can complete the work alone is 20x, 12x and 15x days respectively.
ATQ,
\[
\frac{12}{20x} + \frac{12}{12x} = \frac{80}{100}
\]
⇒ \[
240x + 240x = 1440
\]
⇒ \[
\frac{240}{240}x = \frac{x}{5}
\]
⇒ x = 2
Let in ‘a’ days ‘B’ and ‘C’ can complete 60% of work
ATQ,
\[
\frac{a}{12\times2} + \frac{a}{15\times2} = \frac{60}{100}
\]
⇒ \[
\frac{5a + 4a}{120} = \frac{3}{5}
\]
⇒ a = \[
\frac{3}{5} \times \frac{120}{9} = 8
\]
Q7. There are two vessel A and B containing mixture of milk and water in the ratio 5 : x and 8 : 15 respectively. Vessel A contains 48 L of mixture. 12 L of mixture from vessel A is replaced by 23 liters of mixture
from vessel B. Final ratio of milk to total mixture in vessel A become 23 : 59. Find value of x.

Remaining milk in vessel A after 12 L of mixture is removed
\[= \frac{5}{5+x} \times 48 - 12 \times \frac{5}{5+x}\]
Milk in vessel A after adding mixture from vessel B
\[= 48 \times \frac{5}{5+x} - 12 \times \frac{5}{5+x} + 23 \times \frac{8}{23}\]
According to question
\[
\frac{\frac{5}{5+x} \times 36 + 8}{\frac{5}{5+x} \times 36 + 8} = \frac{23}{59}
\]
\[\Rightarrow \frac{5}{5+x} \times 36 = 23\]
\[\Rightarrow \frac{5}{5+x} = 3\]
\[\Rightarrow 5 + x = 12\]
\[\Rightarrow x = 7\]

Q8. The speed of boat in still water is 5 km/hr more than speed of current and the ratio of speed of boat in downstream to the speed of boat in still water is 4 : 3. Find downstream distance covered by boat in 3 hours.
(a) 33 km
(b) 30 km
(c) 36 km
(d) 39 km
(e) 24 km

Let the speed of current be \(x\) km/hr.
And speed of boat in still water = \((x + 5)\) km/hr

ATQ,
\[
\frac{2x+5}{x+5} = \frac{4}{3}
\]
\[\Rightarrow 6x + 15 = 4x + 20\]
\[\Rightarrow 2x = 5\]
\[\Rightarrow x = 2.5 \text{ km/hr}\]
Speed of boat in downstream = \((2x + 5)\) km/hr = 10 km/hr
Required distance = 10 \times 3 = 30 km/hr

Q9. The length of train A is twice that of train B and speed of train A is half of that of train B. If train A crosses a man in 4 sec., then find how long will train B take to cross train A if they go in same direction.

Let, length of train A be 2x m and speed be \(y\) m/s.
Then, length of train B is x m and speed of train B is 2y m/s.
ATQ,
\[ \frac{2x}{y} = 4 \]
Required time = \( \frac{(2x+x)}{(2y-y)} = \frac{3x}{y} = \frac{3 \times 2y}{y} = 6s. \)

Q10. Rahul invested for 2 more months than the time for which Karan invested in the same business. If Karan invested Rs.3500 for 10 months then find the money invested by Rahul, such that ratio of annual profit of Rahul to Karan is 9 : 7.
Rahul invested for 12 months and Karan invested for 10 months.
Let amount invested by Rahul is x.
ATQ,
\[ \frac{12 \times x}{3500 \times 10} = \frac{9}{7} \]
\[ x = \frac{9 \times 3500 \times 10}{7 \times 12} \]
\[ x = Rs. 3750 \]

Directions (11-15): In each of these questions, two equations (I) and (II) are given. You have to solve both the equations and give answer
(a) if x>y
(b) if x≥y
(c) if x<y
(d) if x≤y
(e) if x = y or no relation can be established between x and y.

Q11. I. \( x^2 + 13x + 42 = 0 \)
II. \( y^2 + 11y + 30 = 0 \)
I. \( x^2 + 13x + 42 = 0 \)
\[ \Rightarrow x^2 + 7x + 6x + 42 = 0 \]
\[ \Rightarrow x = -7 \text{ or } -6 \]
II. \( y^2 + 11y + 30 = 0 \)
\[ \Rightarrow y^2 + 6y + 5y + 30 = 0 \]
\[ \Rightarrow y = -5 \text{ or } -6 \]
\[ \Rightarrow y ≥ x \]

Q12. I. \( x^2 - 9x - 90 = 0 \)
II. \( y^2 + 14y + 48 = 0 \)
I. \( x^2 - 9x - 90 = 0 \)
\[ \Rightarrow x^2 - 15x + 6x - 90 = 0 \]
⇒ x = +15, −6

II. \( y^2 + 14y + 48 = 0 \)
⇒ \( y^2 + 8y + 6y + 48 = 0 \)
⇒ \( y = -8, -6 \)

Q13. I. \( 4x^2 + 16x + 15 = 0 \)
II. \( 3y^2 + 4y + 1 = 0 \)
I. \( 4x^2 + 16x + 15 = 0 \)
⇒ \( 4x^2 + 10x + 6x + 15 = 0 \)
⇒ \( (2x + 5)(2x + 3) = 0 \)
⇒ \( x = -\frac{5}{2}, -\frac{3}{2} \)

II. \( 3y^2 + 4y + 1 = 0 \)
⇒ \( 3y^2 + 3y + y + 1 = 0 \)
⇒ \( (y + 1)(3y + 1) = 0 \)
⇒ \( y = -1, -\frac{1}{3} \)
⇒ \( y > x \)

Q14. I. \( x^2 + 2x - 35 = 0 \)
II. \( y^2 + 3y - 10 = 0 \)
I. \( x^2 + 2x - 35 = 0 \)
⇒ \( x^2 + 7x - 5x - 35 = 0 \)
⇒ \( x(x + 7) - 5(x + 7) = 0 \)
⇒ \( x = 5, -7 \)

II. \( y^2 + 3y - 10 = 0 \)
⇒ \( y^2 + 5y - 2y - 10 = 0 \)
⇒ \( (y + 5)(y - 2) = 0 \)
⇒ \( y = -5, 2 \)
⇒ no relation can be established between x and y

Q15. I. \( 3x^2 + 2x - 5 = 0 \)
II. \( 2y^2 + y - 6 = 0 \)
I. \( 3x^2 + 2x - 5 = 0 \)
⇒ \( 3x^2 + 5x - 3x - 5 = 0 \)
⇒ \( x(3x + 5) - 1(3x + 5) = 0 \)
⇒ \( x = -\frac{5}{3} \) or \( 1 \)

II. \( 2y^2 + y - 6 = 0 \)
⇒ \( 2y^2 + 4y - 3y - 6 = 0 \)
\[ 2y(y + 2) - 3(y + 2) = 0 \]
\[ y = -2 \text{ or } \frac{3}{2} \]

Relationship can't be established.

**Direction (16 – 20): Read the data carefully and answer the questions:**

There are four hostels A, B, C & D. Total 26,00 students living in the three hostels A, B, & C and ratio of total students living in these three (A : B : C) is 21: 16: 15 respectively. Number of boys in A is 250 more than that of girls in C and ratio of number of girls in A to that of boys in C is 9: 8. Number of girls in B is 70% of the number of boys in A. Total 1000 students living in D and number of boys in D is 200 more than that of in C.

**Q(16 – 20)**

Total students in A = \( 2600 \times \frac{21}{52} = 1050 \)

Total students in B = \( 2600 \times \frac{16}{52} = 800 \)

Total students in C = \( 2600 \times \frac{21}{52} = 750 \)

Let number of girls in A and number of boys in C be 9x and 8x respectively.

Number of boys in A = (1050 – 9x)

Number of girls in C = (750 - 8x)

ATQ

\[ (1050 - 9x) - (750 - 8x) = 250 \]

\[ x = 50 \]

Number of girls in A = 450

Number of boys in A = 1050 - 450 = 600

Number of boys in C = 400

Number of girls in C = 750 - 400 = 350

Number of girls in C = \( \frac{70}{100} \times 600 = 420 \)

Number of boys in B = 800 - 420 = 380

Total Boys in D = 400 + 200 = 600

So, total girls in D = 1000 - 600 = 400

<table>
<thead>
<tr>
<th>Hostels</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>600</td>
<td>450</td>
<td>1050</td>
</tr>
<tr>
<td>B</td>
<td>380</td>
<td>420</td>
<td>800</td>
</tr>
<tr>
<td>C</td>
<td>400</td>
<td>350</td>
<td>750</td>
</tr>
<tr>
<td>D</td>
<td>600</td>
<td>400</td>
<td>1000</td>
</tr>
</tbody>
</table>
Q16. **Find average number of boys in A & D?**

Required average = \(\frac{600 + 600}{2} = 600\)

Q17. **Total girls in A are what percent more than that of in D?**

Required percentage = \(\frac{450 - 400}{400} \times 100 = 12.5\%\)

Q18. **Find ratio of total students in C to total girls in A & C together?**

Required ratio = \(\frac{750}{(450 + 350)} = 15 : 16\)

Q19. **Find difference between total boys in B & C together and total girls in A?**

Required difference = \((380 + 400) - 450 = 330\)

Q20. **Total girls in A is what percent of total boys in D?**

Required percentage = \(\frac{450}{600} \times 100 = 75\%\)

Q21. **A man invested Rs. 800 at SI for 2 years. If he had invested this amount at CI at same rate of interest, he would receive Rs. 32 more as an interest amount. Find rate of interest per annum.**

(a) 16%
(b) 20%
(c) 10%
(d) 15%
(e) None of these

Let rate of interest be R.

ATQ,

\[
800 \left[1 + \frac{R}{100}\right]^2 - 800 - \frac{(800)R \times 2}{100} = 32
\]

\[
8 \left[\frac{10000 + R^2 + 200R}{100}\right] - 800 - 16R = 32
\]

\[
\Rightarrow \frac{10000 + R^2 + 200R}{100} - 100 - 2R = 4
\]

\[
\Rightarrow 10000 + R^2 + 200R - 10000 - 200R = 400
\]

\[
R^2 = 400
\]

R = 20%

Q22. **Height of a right circular cylinder whose volume is 500\(\pi\) cm\(^3\) of radius 10 cm, is equal to the diagonal of a square. Then find the perimeter of square?**

Volume of right circular cylinder \((V) = \pi r^2 h\)
ATQ,
\[ \pi r^2 h = 500\pi \]
\[ \pi \times 10 \times 10 \times h = 500\pi \]
h = 5 cm.
Let side of square be a cm.
∴ diagonal = \( \sqrt{2} a \)
\[ \sqrt{2} a = 5 \]
a = \( \frac{5}{\sqrt{2}} \)
∴ Perimeter of square = \( 4a = 4 \times \frac{5}{\sqrt{2}} \)
= \( 10\sqrt{2} \) cm

Q23. A shopkeeper gives a discount of 20% on marked price of article A and C.P. of another article B is 20% more than selling price of article A. If shopkeeper sold article B at 15% profit & S.P. of article B is Rs 1216 more than SP of article A. Then find M.P of article A?
Let marked price of Article A be Rs 100x
S.P. of article A = 100x × \( \frac{80}{100} \) = Rs 80x
C.P. of article B = \( \frac{80}{5} \times \frac{6}{5} \) = Rs 96x
S.P. of article B = \( \frac{96}{100} \times \frac{115}{100} \) = Rs 110.4x
Atq,
\[ 110.4x - 80x = 1216 \]
x = 40
∴ marked price of article A = 40 × 100
= Rs 4000

Q24. In a firm, 60% of the employees are females and 75% of the male employees earn more than Rs. 35,000 per year. If 45% of the company’s employees earn more than Rs. 35,000 per year, then what percentage of female employees earn Rs. 35,000 per year or less?
Let total employees = x
Female employees = \( \frac{3x}{5} \), male employees = \( \frac{2x}{5} \)
Number of male employees who earn more than Rs. 35,000 = \( \frac{3}{4} \times \frac{2x}{5} = \frac{3}{10}x \)
Number of employees who earn more than Rs. 35,000. = \( \frac{9x}{20} \)
Number of female employees who earn more than
Rs. 35,000 = \frac{3x}{20} \\
Required \% = \frac{3x}{\frac{5}{20}} \times 100 \\
= \frac{3}{4} \times 100 = 75\% \\
Q25. A bag contains 4 red, 5 yellow and 6 green balls. 3 balls are drawn randomly. What is the probability that the balls drawn contain no yellow ball? 
There are four cases → 3R, (1R, 2G), (2R, 1G), 3G 
∴ Required probability 
= \binom{4}{3} + \binom{4}{1} \times \binom{6}{2} + \binom{4}{2} \times \binom{6}{1} + \binom{6}{3} 
= \frac{\binom{15}{3}}{\binom{4+6+15}{6+20}} 
= \frac{91 \times 5}{91 \times 5} 
= \frac{24}{91} 
Q26. 120.09 \% of 34.92 + ?^2 = (13.99)^2 − 10.01 
\frac{120}{100} \times 35 + ?^2 = 14^2 − 10 
42 + ?^2 = 196 − 10 
?^2 = 186 − 42 
?^2 = 144 
? = 12 
Q27. 56.01 \times ? + 139.98 = 420.01 
56 \times ? + 140 = 420 
56 \times ? = 420 − 140 
? = \frac{280}{56} 
? = 5 
Q28. (18.01)^2 + ? = (22.01)^2 
(18)^2 + ? = (22)^2 
324 + ? = 484 
? = 484 − 324 
? = 160 
Q29. \frac{264.01}{?} + 167.98 = 24.99\% of 760.01
\[
\begin{align*}
\frac{264}{?} + 168 &= \frac{25}{100} \times 760 \\
\frac{264}{?} &= 190 - 168 \\
\frac{264}{?} &= 22 \\
? &= 12
\end{align*}
\]

Q30. 14.09% of 250.01 + \( ?^3 \) = \((12.99)^2 - (27.01)^{\frac{2}{3}} \)
\[
\frac{14}{100} \times 250 + ?^3 = (13)^2 - (27)^{\frac{2}{3}}
\]
\[35 + ?^3 = 169 - 9\]
\[?^3 = 160 - 35\]
\[?^3 = 125\]
\[? = 5\]

**Directions (31-35):** Given graph shows the total number of males and females in five different companies in year 2006. Study the given line graph carefully and answer the following questions.

Q31. **Number of male employees in company B in 2006 is what percent of female employee of all the companies together (approximate)?**

Male employee in company B = 2000

Total employee in all company = 750 + 1250 + 1000 + 2000 + 2000 + 2500 = 9500
Required% = \frac{2000}{9500} \times 100 \approx 21\%

Q32. If in year 2007 company A, B and C increase the female strength by 10, 20 and 30 percent respectively and same company decrease the male strength by 20, 30 and 40 respectively then find the ratio of female to male in company A, B and C together in year 2017.

Required ratio = \frac{\frac{750}{10} \times \frac{11}{10} + \frac{1250}{10} \times \frac{12}{10} + \frac{1000}{10} \times \frac{13}{10}}{\frac{2500}{10} \times \frac{8}{10} + \frac{2000}{10} \times \frac{7}{10} + \frac{2000}{10} \times \frac{6}{10}}

= \frac{825 + 1500 + 1300}{2000 + 1400 + 1200}

= \frac{3625}{4600}

= 145 : 184

Q33. If in company D 40% female are post graduate and male postgraduate to non-post graduate ratio is 3 : 2 in same company, then male-non post graduate and female non post graduate together are how much percent of total female of company B.

Female in company D = 2000
Post graduate female in company D
= \frac{40}{100} \times 2000 = 800

Non post graduate female in company D
= 2000 – 800 = 1200

Total male in company D = 1750
Post graudate male in company D
= \frac{3}{5} \times 1750
= 1050

Non post graduate male in company D
= 1750 – 1050 = 700

Required% = \frac{\frac{700 + 1200}{1250} \times 100}{100}

= \frac{1900}{1250} \times 100

= 152\%

Q34. Average of male working in company A, C, D and F in 2006 are how much more or less than average of female working in company B, D, E and F in 2007 in every company female employee are increased by 20%.

(a) 58
(b) 37
(c) 18
Total male in company A, C, D, F in 2006
= 2500 + 2000 + 1750 + 3000
= 9250

Total female in 2007 in company B, D, E, F
= 1250 × \(\frac{12}{10}\) + 2000 × \(\frac{12}{10}\) + 2000 × \(\frac{12}{10}\) + 2500 × \(\frac{12}{10}\)
= 1500 + 2400 + 2400 + 3000
= 9300

Required difference of average
= \(\frac{9300}{4} - \frac{9250}{4}\)
= \(\frac{1}{4}(9300 - 9250)\)
= \(\frac{50}{4}\)
= 12.5

Q35. Total male employee in D is what percent more than total female employee in B?

Required percentage = \(\frac{1750 - 1250}{1250} \times 100\)
= \(\frac{500}{1250} \times 100\) = 40%

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