Part- A.

Q1. Let the number be x

$$\frac{x}{4/5} - x \times \frac{4}{5} = 36$$

$$\frac{5x}{4} - \frac{4x}{5} = 36, \quad \frac{25x - 16x}{20} = 36$$

$$9x = 36 \times 20, \quad x = \frac{36 \times 20}{9}$$

$$x = 80.$$

Q2. Let the M.P be Rs. x

$$x - 25\% \text{ of } x = 1000$$

$$x - \frac{25}{100} \times x = 1000, \quad x - x/4 = 1000$$

$$\frac{4x - x}{4} = 1000, \quad x = 4000/3$$

Profit of 10% = 110% of $4000/3$

$$= \frac{110}{100} \times \frac{4000}{3} = \frac{4400}{3}$$

$$= \text{Rs. } 1466.67.$$

Q3. $3\sqrt{2}, 2\sqrt{8}, \sqrt{50}, 4, 4\sqrt{23}$

Squaring the numbers.

$(3\sqrt{2})^2, (2\sqrt{8})^2, (\sqrt{50})^2, 4^2, (4\sqrt{23})^2$

$9 \times 2, 4 \times 8, 50, 16, 16 \times 23$

$18, 32, 50, 16, 368$

$16 < 18 < 32 < 50 < 368$

$4 < 3\sqrt{2} < 2\sqrt{8} < \sqrt{50}, < 4\sqrt{23}$

Q4. $\frac{x-3}{5} + \frac{x-4}{7} = 6 + \frac{2x-1}{35}$

$\frac{x-3}{5} + \frac{x-4}{7} - \frac{2x-1}{35} = 6$

$\frac{7x-21+5x-20-2x+1}{35} = 6$

$10x - 40 = 6 \times 35$

$10x = 210 + 40$

$10x = 250$

$x = 250/10 = 25$

$x = 25.$

05. Let the initial price be Rs. x

$$x + 14\% \text{ of } x = 1100$$

$$x + \frac{14x}{100} = 1100$$

$$\frac{100x + 14x}{100} = 1100$$

$$114x = 1100 \times 100$$

$$x = \frac{1100 \times 100}{114}$$

$$x = \frac{110000}{114} = \text{Rs. } 964.9 \text{ Ans.}$$

06. Given inner Dimension:

$l = 2m, \quad b = 1.2m, \quad h = 0.75m$

Outer Dimension:

$L = 2m + 2(0.025) = 2 + 0.05 = 2.05m$

$B = 1.2 + 0.05 = 1.25m$

$H = 0.75 + 0.05 = 0.8m$

Volume of wood $= L \times B \times H - l \times b \times h$

$= 2.05 \times 1.25 \times 0.8 - 2 \times 1.2 \times 0.75$

$= 2.05 - 1.8$

$= 0.25\ m^3$

Total cost $= 0.25 \times 5400 = 1350.$

Q7. Let the Principal be Rs. x

Time = 7 years.

Amount = $2x$

SI = A − P = Rs. x

$$R = \frac{SI \times 100}{P \times T} = \frac{x \times 100}{x \times 7}$$

$$= \frac{100}{7}$$

$$R = 14.28\%$$

Q8. Speed = 60 km/hr.

$T_2 - T_1 = 1$

Let the distance be x

$$\frac{x}{60} - \frac{x}{80} = 1$$

$$\frac{4x - 3x}{240} = 1$$

$$x = 240 \text{ km}$$

Time taken by 2nd car to reach to 1st car = $\frac{240}{80} = 3$ hr.

Q9.

	425
4	180675
	-16
82	206
	-164
845	4275
	4225
	50

50 must be subtracted to make perfect square.

Q10. MP : CP = 5 : 3

let M.P = $5x$, C.P = $3x$

Discount = $4a\%$

Selling Price :

$$5x\left(1-\frac{4a}{100}\right) = 5x\left(\frac{100-4a}{100}\right)$$

SP using loss :

Loss = $2a\%$

$$S.P = 3x\left(1-\frac{2a}{100}\right) = 3x\left(\frac{100-2a}{100}\right)$$

On comparing :

$$5x\left(\frac{100-4a}{100}\right) = 3x\left(\frac{100-2a}{100}\right)$$

$$500-20a = 300-6a$$

$$14a = 200, \quad a = \frac{200}{14} = 14.28.$$

011. $d_1 = 180\,m$, $d_2 = 270\,m$

time $= 18\,sec$

$d = 180 + 270 = 450\,m$

$$\text{speed} = \frac{D}{t} = \frac{450}{18} \times \frac{18}{5}$$

Speed $= 90\,km/hr$

Q12. d_1 = diagonal $(d_1) = 12$ cm.

diagonal $(d_2) = 15$ cm

Area $= B \times h$

$$\text{Area} = \frac{1}{2} d_1 \times d_2 = \frac{1}{2} \times 12 \times 15 = 90 \text{ cm}^2$$

$$\text{Base (side)}^2 = \left(\frac{d_1}{2}\right)^2 + \left(\frac{d_2}{2}\right)^2$$

$$(\text{side})^2 = (6)^2 + \left(\frac{15}{2}\right)^2 = 36 + \frac{225}{4}$$

$$(\text{side})^2 = \frac{144+225}{4} = \frac{369}{4}$$

$$(\text{side}) = \sqrt{\frac{369}{4}} = \frac{3\sqrt{41}}{2}$$

$$B \times h = 90$$

$$h = \frac{90 \times 4}{3\sqrt{41}} = \frac{180}{3\sqrt{41}} = \frac{60}{\sqrt{41}}$$

$$h = \frac{60 \times \sqrt{41}}{41} = \frac{60\sqrt{41}}{41} \text{ Ans.}$$

Q13. Let the C.P = 100

M.P = 125% of 100 = 125

$S.P = \frac{96}{100} \times 125 = 112.5$

$\text{Profit \%} = \frac{SP - C.P}{C.P} \times 100$

$= \frac{112.5 - 100}{100} \times 100$

$= 12.5\%$

Q14. Let the ratio be x

$3x + 5x + 7x + 9x = 360$

$24x = 360$

$x = \frac{360}{24}$

$x = 15$

$3x = 45^\circ,\ 5x = 75^\circ,\ 7x = 105^\circ,\ 9x = 135^\circ$

Q15. x^4+2x^3-2x-1 , x^6-1

$2x^3-2x+x^4-1$, $(x^2)^3-1^3$

$2x(x^2-1)+(x^2+1)(x^2-1)$, $(x^2-1)(x^4+x^2+1)$

$(x^2-1)(2x+x^2+1)$, $(x^2-1)(x^4+x^2+1)$

HCF $= x^2-1 = (x-1)(x+1)$ Ans.

Q16. Let their Ages be h, w, s

$$\frac{h-3+w-3+s-3}{3} = 27$$

$h+w+s-9=81$, $h+w+s=90$ — (1)

$$\frac{w-5+s-5}{2} = 20$$

$w+s-10=40$, $w+s=50$ — (2)

from (1) and (2)

$50+h=90$

$h=40$ years.

Q17. Container 1 (3L) = 2:3

Spirit = 2/5, water = 3/5

Container 2 (4L) = 3:7

Spirit = 3/10, water = 7/10

Container 3 (5L) = 4:11

Spirit = 4/15, water = 11/15

Total spirit = $3 \times \frac{2}{5} + 4 \times \frac{3}{10} + 5 \times \frac{4}{15}$

$= 6/5 + 6/5 + 4/3 = 56/15$

Total water = $3 \times 3/5 + 4 \times \frac{7}{10} + 5 \times \frac{11}{15}$

$= 9/5 + 14/5 + 11/3 = 124/15$

Ratio = Spirit : water = 56 : 124 = 14 : 31

Q18. $x \times x = 225 \times 144$

$x^2 = 225 \times 144$

$x = \sqrt{225 \times 144}$

$x = 15 \times 12$

$x = 180\,m$

Side of Square = 180m.

Q19. Let the 100kg of fresh fruits be dried.

Fresh Fruit = 70% water

In 100kg.

Solid pulp = $100 \times 30\% = 30kg$.

In dry fruit:

20% of water, 80% of pulp.

Let the final dry fruit weight = x kg

$x \times 80\% = 30$

$x = \frac{30 \times 100}{80} = \frac{75}{2} = 37.5kg$.

Q20. $t_1 = \frac{120}{40} = 3hr$

$t_2 = \frac{145}{58} = 2.5hr$

$t_3 = 0.5hr.$

Total time = $3 + 2.5 + 0.5 = 6hr.$

Total distance = $120 + 145 + 35 = 300km$

Average speed = $\frac{\text{Total Distance}}{\text{Total time}}$

$= \frac{300}{6} = 50km/hr.$

Q21. Total Marks = 440.

$$SST = \frac{45^\circ}{360^\circ} \times 440 = 55 \text{ Marks.}$$

$$\text{Hindi} = \frac{54^\circ}{360^\circ} \times 440 = 66 \text{ Marks}$$

$$\text{English} = \frac{72^\circ}{360^\circ} \times 440 = 88 \text{ Marks}$$

$$\text{Science} = \frac{81^\circ}{360^\circ} \times 440 = 99 \text{ Marks}$$

$$\text{Maths} = \frac{108}{360^\circ} \times 440 = 132 \text{ marks.}$$

Q22. One hour work of shyam $= \frac{1}{15}$

One hour work of Ram $= \frac{1}{21}$

Let the time taken to complete the work is x hours.

$x-2$ hour work of shyam $= \frac{x-2}{15}$

x hour work of Ram $= \frac{x}{21}$

$$\frac{x-2}{15} + \frac{x}{21} = 1$$

$$\frac{7x - 14 + 5x}{105} = 1$$

$$12x - 14 = 105$$

$$12x = 119$$

$$x = \frac{119}{12} \text{ hours.}$$

Q23. Let the present age of Son be x years.

Son's Age two year ago $= x - 2$ years.

Father age 2 year Ago $= 6(x-2)$ years

After 18 years:

Son's Age $= x + 18$ years.

Father's Age $= 2(x+18)$ years.

Equating Father's Age.

$$6(x-2) + 2 + 18 = 2(x+18)$$

$$6x - 12 + 2 + 18 = 2x + 36$$

$$4x + 8 = 36$$

$$4x = 36 - 8 = 28$$

$$x = \frac{28}{4} = 7 \text{ year}$$

Son $= 7$ years, Father $= 6(x-2) + 2$

$= 32$ year.

Q24: (a) $x^4 - (y+z)^4$

$(x^2 - (y+z)^2)(x^2 + (y+z)^2)$

$(x^2 - (y^2+z^2+2xy))(x^2 + y^2 + z^2 + 2yz)$

$(x^2 - (y+z)^2)(x^2 + y^2 + z^2 + 2yz)$

$(x - (y+z))(x + (y+z))(x^2 + y^2 + z^2 + 2yz)$

$(x - y - z)(x + y + z)(x^2 + y^2 + z^2 + 2yz)$

(b) $4x^2 - 4xy + y^2 - 9z^2$

$(a-b)^2 = a^2 + b^2 - 2ab$

$(2x - y)^2 - (3z)^2$

$(2x - y + 3z)(2x - y - 3z)$

Q25. (a) State R:

Below poverty = 24%

Above poverty = 76%

Male : Female = 2 : 3, Male above poverty = 1.9 million

Total above poverty.

Male 2 part out of 5.

Total above poverty = $\frac{1.9}{2} \times 5 = 4.75$ million

Above poverty = 76% of total population:

$0.76 \times \text{Total} = 4.75$

$\text{Total} = \frac{4.75}{0.76} = 6.25$ million

(b) State P:

- Below poverty = 35%
- Below poverty Male : Female = 5 : 6

Female below poverty = 2.1 million

Total below poverty:

Femal = 6 parts:

Total below poverty = $\frac{2.1}{6} \times 11 = 3.85$ million

Total population = 35% of 11 = 3.85

$\text{Total} = \frac{3.85}{0.35} = 11$ million.

$11 - 3.85 = 7.15$ million.

Male : Female = 6 : 7

Male = $\frac{6}{13} \times 7.15 = 3.3$ million

(c) State = S

Total population = 7 million

Below poverty = 19%

= 1.33 million

Above poverty = 5.67 million

Male : Female = 4 : 3

Female above : $\frac{3}{7} \times 5.67 = 2.43$ million

(d) Q; Below poverty = 25%

Total male = 2.4 million

Male : Female = 3 : 5

Total below Q : $= \frac{2.4}{3} \times 8 = 6.4$ million

Total population Q = $\frac{6.4}{0.25} = 25.6$ million

T: Below poverty = 15%

Total population T = 6 million

Below poverty T : = $0.15 \times 6 = 0.9$ million

Ratio Q : T.

$25.6 : 6 = \frac{256}{60} = 64 : 15$ Ans.

Q26: Initial mixture = water : Syrup = 5 : 11

Total part = 5 + 11 = 16 parts.

Initial concentration of syrup = $\frac{11}{16}$

Final mixture = Syrup : water = 3 : 2

Total parts = 3 + 2 = 5 parts

Final concentration of syrup = $\frac{3}{5}$

~~let~~ Let x fraction of mixture is drawn and replaced with water.

$$\frac{11}{16}(1-x) = \frac{3}{5}$$

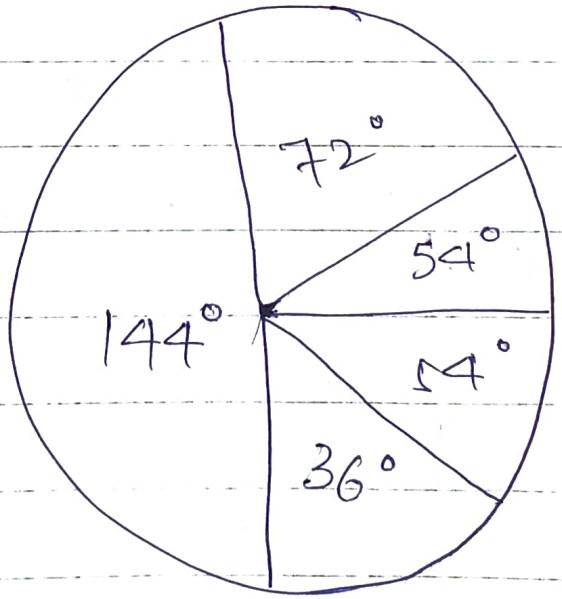
$$1-x = \frac{3}{5} \times \frac{16}{11} = \frac{48}{55}$$

$$x = \frac{7}{055}$$

$$\text{Ans} = \frac{7}{55} \text{ Ans.}$$

Q27: Total = 10,000.

Item	Expenditure	Central Angle.
• Food	4000	$\frac{4000}{10000} \times 360^\circ = 144^\circ$
• Clothing	2000	$\frac{2000}{10000} \times 360^\circ = 72^\circ$
• Rent	1500	$\frac{1500}{10,000} \times 360^\circ = 54^\circ$
• Education	1500	$\frac{1500}{10,000} \times 360^\circ = 54^\circ$
• Miscellaneous	1000	$\frac{1000}{10000} \times 360^\circ = 36^\circ$



28. $x+y=72, \quad x-y=18$

Adding Both Equation

$x+y+x-y = 72+18$

$2x = 90$

$x = 45$

$x+y=72, \quad y = 72-45 = 27$

$x = 45, \quad y = 27.$

29. $a = 7cm$

Total surface area $= 6a^2$

$= 6 \times 7 \times 7$

$= 294\ cm^2.$

Volume of cube $= a^3 = 7 \times 7 \times 7$

$= 343\ cm^3.$

Q30. $P = 75000, \quad A = 92610, \quad T = 6 year.$

$$\frac{A}{P} = \left(1+\frac{R}{100}\right)^n$$

$$\frac{92610}{75000} = \left(1+\frac{R}{100}\right)^6 \rightarrow \left(\frac{9261}{7500}\right)^{1/6} = 1+\frac{R}{100}$$

$1+\frac{R}{100} = (1.2348)^{1/6}, \quad \frac{R}{100} = 0.03578$

$R\% = 3.58\%.$