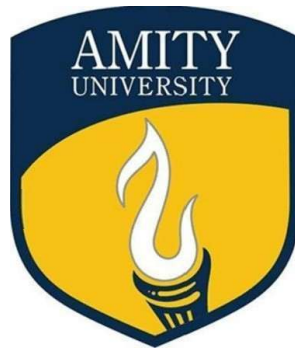


# Amity University Madhya Pradesh



QUANTITATIVE APTITUDE  
(CSE - 602)

ASSIGNMENT

Submitted To  
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Q1 (i) if  $\log_{10}(x^2 - 6x + 45) = 2$ , find the value of  $x$

(ii)  $x$  is a true integer such that - - -

- - - find the no.

Ans-1 (i)  $\log_{10}(x^2 - 6x + 45) = 2$

$$\log_{10}(A) = 2 \Rightarrow A = 10^2 = 100$$

So,

$$x^2 - 6x + 45 = 100 \Rightarrow x^2 - 6x + 45 - 100 = 0$$

$$\Rightarrow x^2 - 6x - 55 = 0$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4(1)(-55)}}{2(1)}$$

$$= \frac{6 \pm \sqrt{36 + 220}}{2}$$

$$= \frac{6 \pm 16}{2}$$

$$x = 11, -5$$

(ii)  $x^2 > 0$

$x^2 + 12$  exactly  $\div$  by  $x$

$\frac{x^2 + 12}{x}$  must be integer

$$\frac{x^2}{x} + \frac{12}{x} = x + \frac{12}{x}$$

$\frac{12}{x} \Rightarrow \text{integer}$  so  $x$  must be divide 12.

possible values of  $n$  are 1, 2, 3, 4, 6, 12

(iii) Sum of LCM & HCF = 592

difference = 518

sum of 2 numbers = 296

HCF =  $h$  and LCM =  $l$

$$l + h = 592$$

$$l - h = 518$$

$$(l + h) + (l - h) = 592 + 518 \Rightarrow 2l = 1110 \Rightarrow l = 555$$

$$h = 592 - l = 592 - 555 = 37$$

$$\text{LCM} = 555$$

$$\text{HCF} = 37$$

$$a = 37m \quad b = 37n \quad \text{gcd}(m, n) = 1$$

$$a + b = 296 \Rightarrow 37m + 37n = 296$$

$$37(m + n) = 296$$

$$m + n = \frac{296}{37} = 8$$

$$\text{LCM}(a, b) = \frac{a \cdot b}{\text{HCF}(a, b)} = \frac{37m \cdot 37n}{37} \Rightarrow 37mn = 555$$

$$mn = \frac{555}{37} = 15$$

$$m + n = 8$$

$$mn = 15$$

$$t^2 - 8t + 15 = 0 \Rightarrow (t - 3)(t - 5) = 0$$

$$m = 3, \quad n = 5$$

& vice versa.

$$a = 37 \times 3 = 111, \quad b = 37 \times 5 = 185$$

$$a = 111, 185 \quad b = 185, 111$$

Q2 (i) In an objective examination of 90 questions,  
5 marks are allotted for every correct  
Answer - - - - - age now?

Ans 2 (i)  $n$  = no. of correct answers  
 $90 - n \Rightarrow$  wrong answers

total marks  $\Rightarrow$

$$5n + (-2)(90 - n) = 387$$

$$5n - 180 + 2n = 387$$

$$n = 81$$

$$\Rightarrow 90 - 81$$

$$\text{wrong} \Rightarrow 9$$

(ii) let fraction be  $\frac{x}{y}$

Cond<sup>n</sup> ①

$$\frac{x+1}{y+1} = \frac{2}{3}$$

$$\frac{x-1}{y-1} = \frac{1}{2} \Rightarrow 2x + y = 3 -$$

$$3x - 2y = -1 \quad \text{--- ①}$$

Cond<sup>n</sup> ②

$$\frac{x-1}{y-1} = \frac{1}{2}$$

$$2x - y = 1 \quad \text{--- ②}$$

solve eq ① & ②

$$y = 2x - 1$$

substitute in eq ①

$$3x - 2(2x - 1) = -1$$

$$x = 3$$

$$y = 2(3) - 1 = 5$$

$$\text{fraction} = \frac{3}{5}$$

$$(ii) \text{ Nishi} = 6x \quad \text{Vinee} = 5x$$

After 9 years

$$6x + 9$$

$$5x + 9$$

$$\frac{6x + 9}{5x + 9} = \frac{9}{8}$$

$$x = 3$$

$$\text{Nishi} = 6x = 18$$

$$\text{Vinee} = 5x = 15$$

$$\text{Diff.} = 18 - 15 = 3$$

Q3 (i) the Average ----- of the consignment

$$\text{Ans 3 (i) Avg age} = 34 \quad \text{total} = 68$$

$$\text{daughter's age} = x \quad \text{man's age} = 68 - x$$

4 years later

$$\frac{72 - x}{x + 4} = \frac{14}{5} \Rightarrow x = 16$$

$$\Rightarrow 16$$

$$(ii) \text{ let sales} = x$$

$$A's \text{ pay} = 360 + 0.06(x - 1000)$$

$$B's \text{ pay} = 0.08x$$

set equal



$$360 + 0.06x - 60 = 0.08x$$

$$300 = 0.02x$$

$$x = 15000$$

(iii) total value =  $x$

$$\frac{2}{3} \text{ sold at } 5\% \text{ profit} = \frac{2x}{3} \times 0.05 = \frac{0.1x}{3}$$

$$\frac{1}{3} \text{ sold at } 2\% \text{ loss} = \frac{x}{3} \times (-0.02) = -\frac{0.02x}{3}$$

total profit:-

$$\frac{0.1x - 0.02x}{3} = \frac{0.08x}{3} = 400$$

$$x = \frac{400 \times 3}{0.08} = 15000$$

Q-4 (i) two pipes can fill - - - - - piece of work?

Ans 4 (i) pipes fill in 14 hrs & 16 hrs

without leak : time = 7 hrs 28 min

with leak : time = 8 hrs

leak's emptying rate =  $\frac{1}{112}$  per hr

(ii) 1 man/day =  $\frac{1}{1296}$  , 1 woman/day =  $\frac{1}{1944}$  ,

1 child/day =  $\frac{1}{3240}$

total rate of 4 men + 12 women + 10 children

=  $\frac{1}{81}$  work/day.

work will be completed in 81 days.

Q-5 (i) By walking ~~at~~ at  $\frac{3}{4}$  ----- rate of stream?

Ans (i) let usual time =  $t$  minutes

speed reduced to  $\frac{3}{4}$ , so time increases  
by  $\frac{4}{3} \times t - t \Rightarrow \frac{t}{3}$

$$\frac{t}{3} = 20 \Rightarrow t = 60$$

usual time = 60 minutes

(ii) let stream speed =  $x$  km/hr

downstream speed =  $6 + x$

upstream speed =  $6 - x$

time upstream is twice that of downstream

$$\frac{d}{6-x} = 2 \times \frac{d}{6+x}$$

$$\frac{1}{6-x} = \frac{2}{6+x}$$

$$\boxed{x=2}$$

rate of stream = 2 km/hr

Q6 (i) A train running ----- 2 years?

Ans 6 (i) Train problem

$$\text{train speed} = 54 \text{ km/hr} = \frac{54 \times 1000}{3600} = 15 \text{ m/s}$$

$$\text{time to pass platform} = 20 \text{ s}$$

$$\text{time to pass a man} = 12 \text{ s}$$

$$\text{man's speed} = 6 \text{ km/hr} = \frac{6 \times 1000}{3600} = 1.67 \text{ m/s}$$

1) length of train

$$\text{rel. speed} = 15 - 1.67 = 13.33 \text{ m/s}$$

$$\text{time} = 12 \text{ s}$$

$$\text{length} = 13.33 \times 12 = 160 \text{ m}$$

2) length of platform

total dis. to pass platform

$$= \text{train length} + \text{platform length}$$

$$\text{speed} = 15 \text{ m/s} \cdot \text{time} = 20 \text{ s}$$

$$\text{dis.} = 15 \times 20 = 300 \text{ m}$$

$$\text{platform length} = 300 - 160 = 140 \text{ m}$$

(ii) Interest problem

$$SI = 8730$$

$$\text{rate} = 6\%$$

$$\text{time} = 3 \text{ years}$$

1) find P

$$SI = \frac{P \times R \times T}{100}, P = \frac{8730 \times 100}{6 \times 3} = 48500$$



2) find C.I. for 2 years at 6%.

$$C.I. = P \left(1 + \frac{R}{100}\right)^T - P$$

$$= 48500 (1.06)^2 - 48500 \approx 48500 \times 1.1236 - 48500 \\ \approx 5984.60$$

$$C.I. = 5984.60$$

Q7 the area of a circle whose  $r = 6\text{cm}$ , is trisected by 2 concentric circles. find the  $r$  of the small circle.

Ans 7  $r = 6\text{cm}$

Area of is trisected by 2 similar concentric circles.

$$\text{Area of smallest circle} = \frac{1}{3} \text{ of total}$$

$$\text{Area of middle ring} = \frac{1}{3}$$

$$\text{Area of outer ring} = \frac{1}{3}$$

1) total Area =

$$\pi r^2 = \pi \times 6^2 = 36\pi$$

2) Area of smallest circle =

$$\frac{1}{3} \times 36\pi = 12\pi$$

3) let radius of smallest circle =  $r$

$$\pi r^2 = 12\pi \Rightarrow r^2 = 12$$

$$r = \sqrt{12}$$

$$2\sqrt{3} \approx 3.46\text{cm}$$

Q-8 the complement (none hits)  
 the  $r$  &  $h$  of a right solid circular cone are  
 $r$  &  $h$  ..... rest of the portion.

Ans 8 surface area of a cone

$$S.A = CSA + B.A$$

$$CSA \text{ of cone} = \pi r l \quad l = \sqrt{r^2 + h^2}$$

$$B.A = \pi r^2$$

$$S.A = \pi r \sqrt{r^2 + h^2} + \pi r^2$$

$$R = \frac{r}{2} \quad h = \frac{h}{2}$$

$$l' = \sqrt{\left(\frac{r}{2}\right)^2 + \left(\frac{h}{2}\right)^2} = \frac{1}{2} \sqrt{r^2 + h^2}$$

$$CSA = \pi \cdot \frac{r}{2} \cdot \frac{1}{2} \sqrt{r^2 + h^2} = \frac{\pi r}{4} \sqrt{r^2 + h^2}$$

$$\text{final } S.A = CSA \text{ of large cone} + B.A + CSA \text{ of inner cone}$$

$$= \pi r \sqrt{r^2 + h^2} + \pi r^2 + \frac{\pi r}{4} \sqrt{r^2 + h^2}$$

$$= \left( \pi r \sqrt{r^2 + h^2} \left( 1 + \frac{1}{4} \right) \right) + \pi r^2$$

$$= \frac{5\pi r}{4} \sqrt{r^2 + h^2} + \pi r^2$$

Q-9 A can hit a target 3 times in 5 shots, and  
 C can 3 times ..... them try

Ans 9 Probability A hits =  $\frac{3}{5}$

$$\text{Probability B hits} = \frac{2}{5}$$

$$\text{Probability C hits} = \frac{3}{4}$$

use complement (none hits)

$$A \text{ misses} = 1 - \frac{3}{5} = \frac{2}{5}$$

$$B \text{ miss} = 1 - \frac{2}{5} = \frac{3}{5}$$

$$C \text{ misses} = 1 - \frac{3}{4} = \frac{1}{4}$$

$$\text{at least one hit} = 1 - \frac{3}{50} = \frac{47}{50}$$

Q-11 (i) Ram moves - - - - - U & S?

Ans 11 (i) Ram's Movement

from point S:

10 m N

20 m W

10 m N

20 m E

10 m right = south

$$\text{Net north} = 10 + 10 - 10 = 10 \text{ m N}$$

$$\text{Net east-west} = 20 \text{ W} - 20 \text{ E} = 0 \text{ m}$$

Ram is 10 m North of south

Direction of P from S: North

(ii) Movements of X and Y:

X:

34 m N

Right  $\rightarrow$  East  $\rightarrow$  34 m

ends at U (34 E, 34 N)

Y =

14m south

Left → East → 32m

→ ends at S(32E, 14S)

Dis. b/w U and S:

$$x\text{-diff.} = 34 - 32 = 2\text{m}$$

$$Y\text{-diff.} = 34 + 14 = 48\text{m}$$

(one is N, other is S)

$$\text{dis.} = \sqrt{2^2 + 48^2} = \sqrt{4 + 2304} = \sqrt{2308} \approx 48.03\text{m}$$

Q-12 statements: Some cats - - - - - None of these?

Ans 12

1) Some cats are Bats

→ some cats are rats + All rats are Bats.

→ Some cats are rats → then rats are Bats

→ But we can't confirm if then cats are Bats

⇒ Not valid

2) All Bats are rats

Actually reverse - All rats are Bats, But we can't say all Bats are rats.

⇒ Not valid

3) All tables are cats

→ No link b/w tables & cats.

⇒ Not valid

4) All Bats are cats

→ No such connection given

→ Invalid

Ans None of these



Q10 Study the following ----- year 2008?

Ans 10 (i) % increase in production of Company A from 2009 to 2010

from the graph:

2009 production  $\approx$  550 tonnes

2010 production  $\approx$  700 tonnes

$$\% \text{ increase} = \frac{700 - 550}{550} \times 100$$

$$= \frac{150}{550} \times 100 \approx 27.27$$

$\Rightarrow$  27% Approx.

(ii) Sales of A in 2009 as % of production of A in 2009.

2009 production  $\approx$  550 tonnes.

2009 sales  $\approx$  400 tonnes

$$\% = (400/550) \times 100 \approx 72.7\%$$

$\Rightarrow$  73% Approx

(iii) Ratio of production of Company B in 2006 to 2008

2006 production of A  $\approx$  750 tonnes

2008 prod. of A  $\approx$  600 tonnes

A : B  $\Rightarrow$

$$2006 \text{ ratio} = 5:4 \rightarrow B = \frac{4}{5} \times 750 = 600$$

$$2008 \text{ ratio} = 3:4 \rightarrow B \Rightarrow \frac{4}{3} \times 600 = 800$$

$$\text{Required Ratio} = 600:800 \Rightarrow 3:4$$

Ans 3:4