A.P. SET CODE
A

MT - w

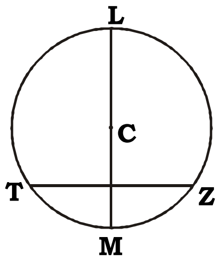
2017 ___ ___ 1100 - MT - w - GENERAL MATHEMATICS (71)GEOMETRY- SET - A (E)

Time : 2 Hours **Preliminary Model Answer Paper** **Max. Marks : 40**

A.1.	**Solve ANY FIVE of the following :**	
(i)	aABC ~ aMNP [Given]	
	$\frac{\text{A (aABC)}}{\text{A (aMNP)}} = \frac{BC^2}{NP^2}$ [By theorem on areas of similar triangles]	½
	y $\frac{\text{A (aABC)}}{\text{A (aMNP)}} = \left(\frac{1}{2}\right)^2$	
	y $\frac{\text{A (aABC)}}{\text{A (aMNP)}} = \frac{1}{4}$	
	y A (aABC) : A (aMNP) = 1 : 4	½
(ii)	$\sin A = \frac{2}{7}$	
	$\text{cosec } A = \frac{1}{\sin A}$	½
	y $\text{cosec } A = \frac{1}{2/7}$	
	y $\text{cosec } A = \frac{7}{2}$	½
(iii)	Radius of circle = 4 cm	
	Largest chord of a circle is Diameter	½
	Diameter = 2 × radius	
	y Diameter = 2 × 4	
	y Diameter = 8 cm	½
(iv)	Midpoint of class 21 - 25	
	$\frac{21 + 25}{2} = 23$	**1**

(v) (a) seg TZ ì chord ½

(b) seg LM ì diameter ½

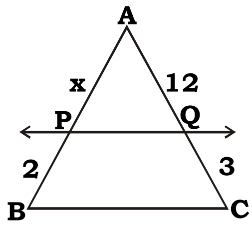


(vi) Sample space = { 1, 2, 3, 4, 5, 6 } **1**

A.2. Solve ANY FOUR of the following :

(i) In aABC,

line PQ || side BC



y $\frac{AP}{PB} = \frac{AQ}{QC}$ [By BPT] **1**

y $\frac{x}{2} = \frac{12}{3}$

y $x = \frac{12 \times 2}{3}$

y $\boxed{x = 8}$ **1**

(ii) Radius of one circle (r_1) = 7 cm

Radius of second circle (r_2) = 9 cm ½

Both the circles touch each other externally

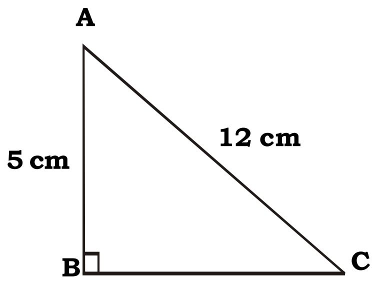
y Distance between the centres = $r_1 + r_2$ ½

= 7 + 9

= 16 cm ½

y The distance between the centres is 16 cm. ½

(iii) Consider, aABC



ĎB = 90°

BC = 12 cm ½

AB = 5 cm

By Pythagoras theorem,

$(AC)^2 = (AB)^2 + (BC)^2$ ½

y $(AC)^2 = (5)^2 + (12)^2$

y $(AC)^2 = 25 + 144$

y $(AC)^2 = 169$ ½

y AC = 169

y AC = 13 cm [Taking square roots]

y The length of hypotenuse is 13 cm. ½

(iv) Ratio of volume = 27:64

Ratio of radii = ?

y $V_1 : V_2 = 27 : 64,\ r_1 : r_2 = ?$

$$\frac{\text{Volume of smaller sphere}}{\text{Volume of larger sphere}} = \frac{\frac{4}{3}\pi \times r_1^3}{\frac{4}{3}\pi \times r_2^3}$$ ½

y $$\frac{27}{64} = \frac{r_1^3}{r_2^3}$$ ½

y $$\frac{27}{64} = \left(\frac{r_1}{r_2}\right)^3$$ ½

y $$\frac{r_1}{r_2} = \frac{3}{4}$$ [Taking cube roots]

y **Ratio of radii is 3 : 4** ½

(v) Exclusive form (Continuous form)

10.5 - 15.5 ½

15.5 - 20.5 ½

20.5 - 25.5 ½

25.5 - 30.5 ½

(vi) length of cuboid (l) = 4 cm

breadth of cuboid (b) = 3 cm

height of cuboid (h) = 6 cm

∴ Volume of cuboid = $l \times b \times h$ **1**

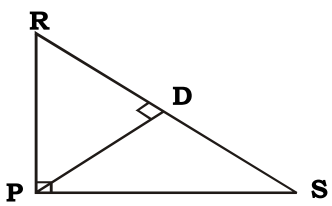
= $4 \times 3 \times 6$

= $72\ cm^3$

∴ **Volume of cuboid is $72\ cm^3$.** **1**

A.3. **Solve ANY THREE of the following :**

(i)



aRPS is right angled triangle

PD { RS

y $PD^2 = RD \times DS$ [By the property of geometric mean] **1**

RD = 4 and DS = 9

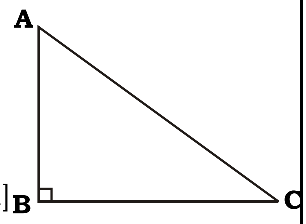
y $PD^2 = 4 \times 9$ **1**

y $PD^2 = 36$

y **PD = 6** **1**

(ii) In aABC,

ĎABC = 90°



$\tan A = \dfrac{7}{24}$ [Given]

$\therefore \tan A = \dfrac{BC}{AB}$ [By definition]

$\therefore \dfrac{BC}{AB} = \dfrac{7}{24}$ ½

Let the common multiple be k.

$\therefore BC = 7k, AB = 24k$ [k is constant, k > 0]

$AC^2 = AB^2 + BC^2$ [By Pythagoras theorem] ½

$\therefore AC^2 = (24k)^2 + (7k)^2$

$\therefore AC^2 = 576k^2 + 49k^2$

$\therefore AC^2 = 625k^2$

$\therefore AC = 25k$ ½

$\cos A = \dfrac{AB}{AC} = \dfrac{24k}{25k} = \dfrac{24}{25}$ ½

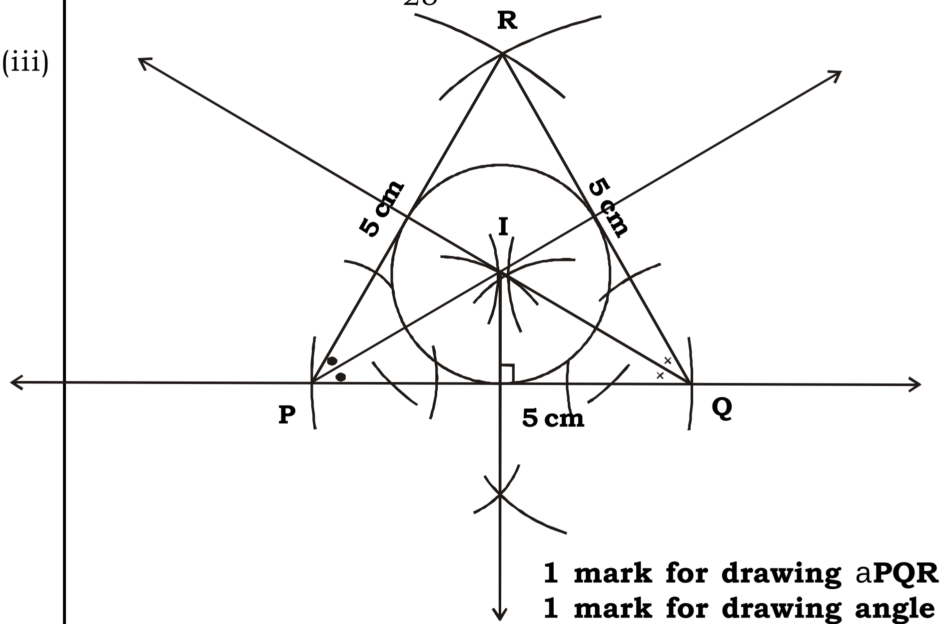
$\sin A = \dfrac{BC}{AC} = \dfrac{7k}{25k} = \dfrac{7}{25}$

$\sin A + \cos A = \dfrac{7}{25} + \dfrac{24}{25}$ ½

$\sin A + \cos A = \dfrac{7 + 24}{25}$

$\therefore \sin A + \cos A = \dfrac{31}{25}$ ½

(iii)



1 mark for drawing aPQR
1 mark for drawing angle bisectors
1 mark fordrawing incircle

(iv) 1 litre = 1000 cm^3

The capacity of the pickle jar = 1 litre ½

Area of its base is 100 cm^2, h = ?

The capacity of the jar = its volume = 1000 cm^3

By the formula we have,

Volume = area of the base × height 1

y 1000 = 100 × h ½

y $h = \frac{1000}{100}$

y h = 10 ½

y **The height of the pickle jar is 10 cm.** ½

(v)

Bowling speed (kms / hr.)	No. of players
85 - 100	9 ì f_1
100 - 115	11 ì f_m
115 - 130	8 → f_2
130 - 145	5

1

Here the maximum frequency f_m = 11

The corresponding class 100 - 115 is the modal class. ½

L = 100, f_m = 11, f_1 = 9, f_2 = 8, h = 15.

$$\text{Mode} = L + \left(\frac{f_m - f_1}{2f_m - f_1 - f_2}\right) \times h$$ ½

$$= 100 + \left(\frac{11 - 9}{2\,(11) - 9 - 8}\right) \times 15$$

$$= 100 + \left(\frac{2}{22 - 17}\right) \times 15$$ ½

$$= 100 + \left(\frac{30}{5}\right)$$

$$= 100 + 6$$

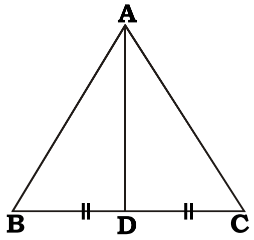
$$= 106$$

y **Mode of bowling speed is 106 km/hr.** ½

A.4. Solve ANY TWO of the following :

(i)

AB² + AC² = 2AD² + 2BD² [Apollonius theorem]



y $11^2 + 17^2 = 2AD^2 + 2(6)^2$

y $121 + 289 = 2AD^2 + 2(36)$

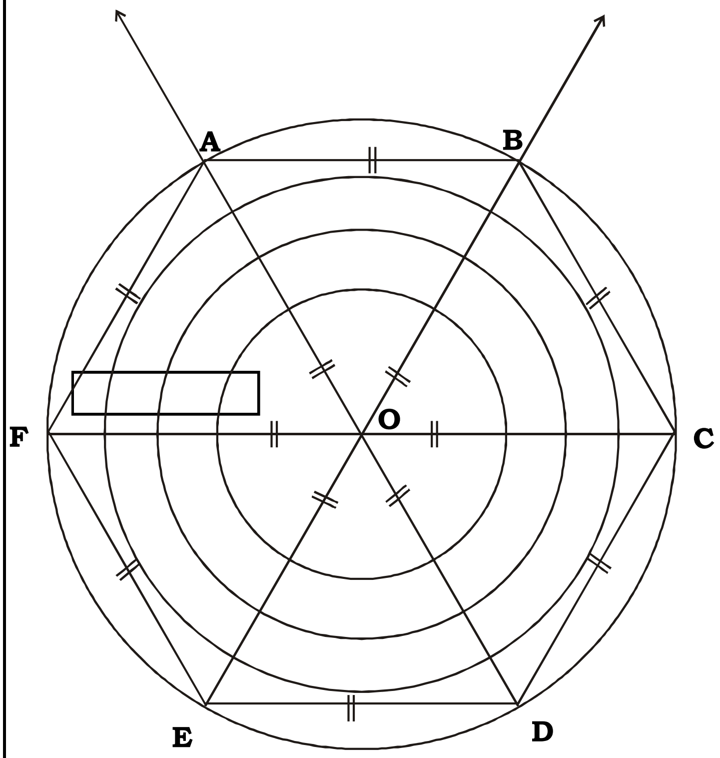
y $410 - 72 = 2AD^2$

y $2AD^2 = 338$

y $AD^2 = 169$

y $\boxed{AD = 13 \text{ cm}}$

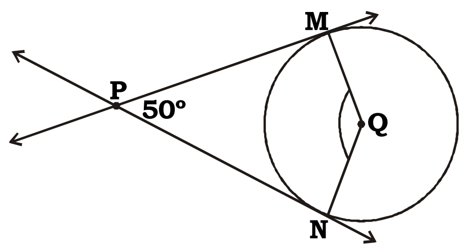
(ii)



2 marks for the regular hexagon

2 marks for three concentric circles

(iii)



m ĎPMQ = m ĎPNQ = 90° ......(i) [Radius is perpendicular to the tangent]

y m ĎPMQ + m ĎMQN + m ĎPNQ + m ĎMPN = 360°

y 90° + m ĎMQN + 90° + 50° = 360°

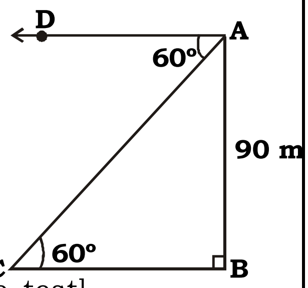
y m ĎMQN + 230° = 360°

y m ĎMQN = 360° – 230

y **m ĎMQN = 130°**

A.5. Solve ANY TWO of the following :

(i)



Seg AB represents the lighthouse
C represents the position of ship.
A represents the position of observer
∠DAC is the angle of depression
AB = 90m
m∠DAC = 60°
∠DAC ≅ ∠ACB [Converse of alternate angle test]

∴ m∠ACB = 60°

In right angled ΔABC

y $\tan 60° = \dfrac{AB}{BC}$ [by definition]

y $\sqrt{3} = \dfrac{90}{BC}$

y $BC = \dfrac{90}{\sqrt{3}}$

y $BC = \dfrac{90}{\sqrt{3}} \times \dfrac{\sqrt{3}}{\sqrt{3}}$

y $BC = \dfrac{90\sqrt{3}}{3}$

y $BC = 30\sqrt{3}$ m

∴ **The ship is $30\sqrt{3}$ m far from the light house.**

(ii) Radius (r) = 14 cm

Let height of a cylinder be 'h'

Curved surface area of cylinder = 2®rh 1

y $1760 = 2 \times \dfrac{22}{7} \times 14 \times h$ ½

y $\dfrac{1760}{2 \times 22 \times 2} = h$

y h = 20 cm 1

Volume of cylinder = ®r^2h **1**

$= \frac{22}{7} \times 14 \times 14 \times 20$

$= 12320\ cm^3$ **1**

y Volume of a cylinder is $12320\ cm^3$. **½**

(iii) Let S be the sample space

y S = { (1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6),
(2, 1), (2, 2), (2, 3), (2, 4), (2, 5), (2, 6),
(3, 1), (3, 2), (3, 3), (3, 4), (3, 5), (3, 6),
(4, 1), (4, 2), (4, 3), (4, 4), (4, 5), (4, 6),
(5, 1), (5, 2), (5, 3), (5, 4), (5, 5), (5, 6),
(6, 1), (6, 2), (6, 3), (6, 4), (6, 5), (6, 6) } **1**

y n (S) = 36

(a) A is the event that sum of numbers on dice is atleast 11

y A = { (5, 6), (6, 5), (6, 6) }

y n (A) = 3

$P(A) = \frac{n(A)}{n(S)}$

y $P(A) = \frac{3}{36}$

y $P(A) = \frac{1}{12}$ **1**

(b) B is the event that sum of the numbers on a dice is divisible by 9

y B ={ (3, 6), (4, 5), (5, 4), (6, 3) }

$P(B) = \frac{n(B)}{n(S)}$

y $P(B) = \frac{4}{36}$

y $P(B) = \frac{1}{9}$ **1**

(c) C is the event that number on upper face of first die is greater than the number on upper face of second die

y C = { (2, 1), (3, 1), (3, 2), (4, 1), (4, 2), (4, 3), (5, 1), (5, 2), (5, 3),
(5, 4), (6, 1), (6, 2), (6, 3), (6, 4), (6, 5) }

y n (C) = 15

$P(C) = \frac{n(C)}{n(S)}$

y $P(C) = \frac{15}{36}$

y $P(C) = \frac{5}{12}$ **1**

(d) D is the event that sum of numbers on their upper faces is a perfect square

y D = { (1, 3), (2, 2), (3, 1), (3, 6), (4, 5), (5, 4), (6, 3) }

y n (D) = 7

y $P(D) = \frac{n(D)}{n(S)}$

y $P(D) = \frac{7}{36}$ **1**

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