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First Term Test - Grade 11 - 2020

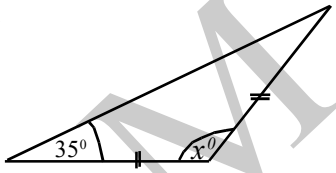
Name/Index No:- ..... **Mathematics - I** **Time:- 2 hours**

- Answer all the questions on the paper it self.
- Each question in part **A** carries 2 marks and each question in part **B** carries 10 marks.

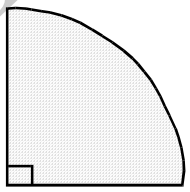
Part A

(1) If $(3.8)^2 = 14.44$. Find the first approximation of $\sqrt{14}$.

(2) Using the information given in the figure, find the magnitude of x.



(3) A sector of 90^0 is cut from a circular lamina with the circumference of 44cm. Find the arc length of the removed portion.



(4) Write $lg\ b = 3$ in index notation.

(5) A box contain 15 identical cards. Out of them 9 are red cards and the rest are blue cards. Write the probability of getting a blue card, when a card is drawn randomly from the box.

(6) Solve. $\frac{x-1}{7} = 1$

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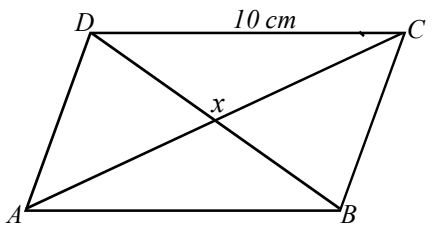
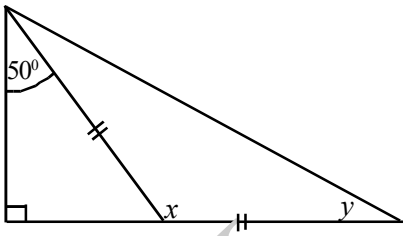
(7) A Rhombus ABCD is given in the figure. If BD = 12 cm and AC = 16 cm, Find the value of $DX + CX + DC$ using the given information.

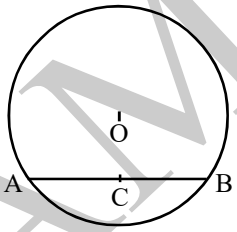


(8) Simplify. $\frac{x}{5} + \frac{x-1}{2}$

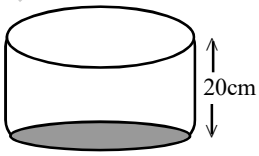
(9) Find the magnitude of x and y, using the given information.



(10) In the given figure, C is the midpoint of the chord AB of a circle with the centre O. Write the relationship btween OC and AB.



(11) The circumference of the base of a cylindarical vessel, of height 20cm is 10.5cm. Calculate the area of the curved surface.

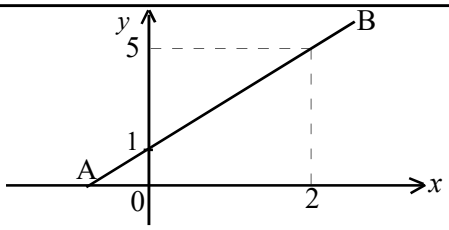


(12) Find the value of $x + y$, without solving the given simultaneous equations.

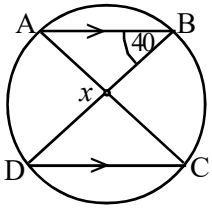
$x + 2y = 7$

$2x + y = 11$

(13) Find the gradient of the straight line AB.



(14) Two chords of the circles AB and CD are intersected at X. Find the magnitude of $D\hat{X}C$, using the given information.



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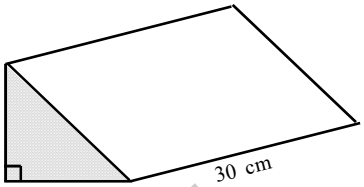
(15) A pipe through which water flows at a uniform rate of 8 ℓ per minute. Calculate the volume of water flows within 30 minutes.

(16) Find the Least Common Multiple (LCM) of the following 3 terms.

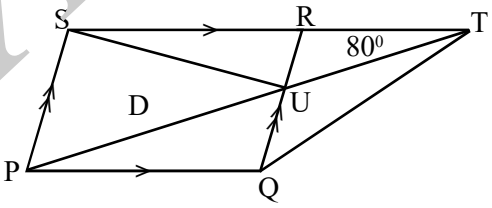
$2x, \quad 3x^2y, \quad 4$

(17) The area of the cross section of a solid prism is $8.5cm^2$. Calculate the volume of the prism.



(18) The assessed annual value of a house within the administrative domain of a certain urban council is Rs. 60 000. The quarterly rate payable on this property is Rs. 2400. Calculate the rate percentage, charged by the urban council.

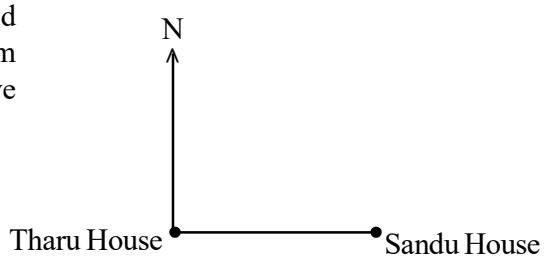
(19) In the parallelogram PQRS, The side SR is produced upto T. Sides PT, SU and RQ are intersected at U. According to the given data, put "✓ " mark infront of the correct statement and "✕" mark infront of the incorrect statement.



(i) Area of the triangle PQT is half or equal to the area of the parallellogram PQRS. ☐

(ii) Area of the triangle PQT is equal to the area of the triangle PSU. ☐

(20) In an inter - house sport meet 'Sandu" house is located 60m east of "Tharu" house. "Hiru" house is located 50 m on a bearing of 120^0 from Sandu house. Indicate the above information in the given figure.



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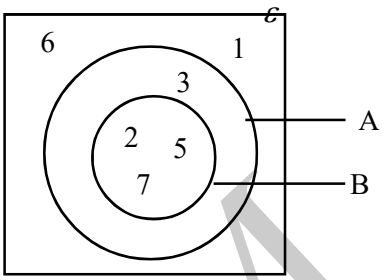
(21) Fill in the blanks of the following table.

Class Interval	Mid value	Deriation
4 - 8	6	------
8 - 12	------	0
12 - 16	------	------

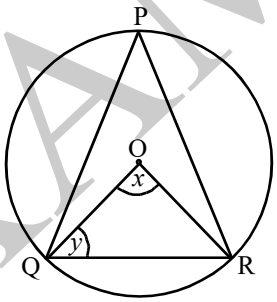
(22) Factorize. $x^2 - 64$

(23) Considering the given Venn diagram.

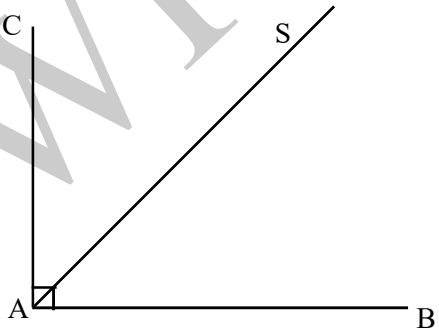
Write down The set $(A \cup B)'$ with its elements.



(24) If $Q\hat{P}R = 70^0$ Of the circle with centre O. Find the value of x and y, using the information given in the figure.



(25) The locus of a point equi-distance from the lines AB and AC is AS. Using the knowledge of loci, sketch a diagram of the constraction lines required to find the position of Q which is 5cm away from the straight line AB and lies on AS.



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Part B

(1) (a) A certain task can be completed in 60 mandays. How many men are required to complete $\frac{2}{3}$ of this task within 5 days?

(b) Mr. Rathnayake donated $\frac{1}{8}$ of a certain amount of money to a charity and invested $\frac{4}{7}$ of the remaining amount for a business.

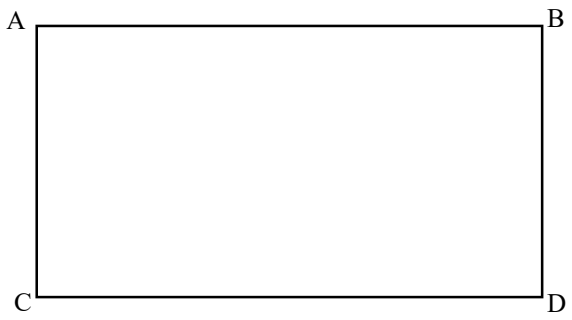
(i) What fraction of the amount remains after he has donated to the charity.

(ii) What fraction of the total amount of money has been allocated for the business?

(iii) The amount of money remains, after donating to a charity and investing to a business is Rs. 60 000. Find the total amount of money Mr. Rathnayake had at the begining.

(2) The given figure is a sketch of a rectangular metal sheet of the length 21 cm and the breadth 18 cm.
The shape of a sector of the circle with an angle of at the centre 90^0 is cut off from the metal sheet according to the following requirements.

* The radius is $\frac{1}{3}$ of the length of the rectangle.
* One side of a sector lies on AD



(i) Draw with measurements, a sketch of the sector to be cut off in the above diagram.

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(ii) Calculate the arc length of the removed sector.

(iii) Find the area of the remaining part of the metal sheet after removing the sector of 90^0.

(iv) It has been decided to fix nails by keeping a gap of 5m along the boundary of the metal sheet. Find the number of nails required for this.

(3) (a) Mr Priyantha's house which lies within the limits of a certain municiple council which charges. 4% of the assessed annual value of the property as rates, has to pay quartely rate of Rs. 560.

(i) How much Mr. Priyantha has to be paid as rate for a year.

(ii) What is the assessed annual value of Mr. Priyantha's house.

(b) Mr. Abdulala paid income tax according to the following table.

Annual Income	Tax percentage
First 500 000	tax free
Next 500 000	4%
Next 500 000	8%

The annual income of Mr. Abdull from his business is Rs. 670 000 and his monthly salary is Rs. 40 000

(i) Calculate Mr. Abdulla's annual salary.

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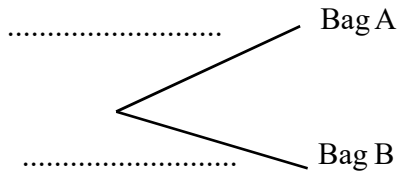
(ii) How much income tax does he have to pay according to his total income?

(4) *(a)* A box contains 2 identical bags named as A and B. There are bulbs of same shape and size, but different colours are in the bags. The table below gives information about bulbs.

	Bag A	Bag B
Red Bulb	1	3
Blue bulb	2	2

An incomeplete tree diagram relevant to selecting a bag randomly is shown in the figure below.

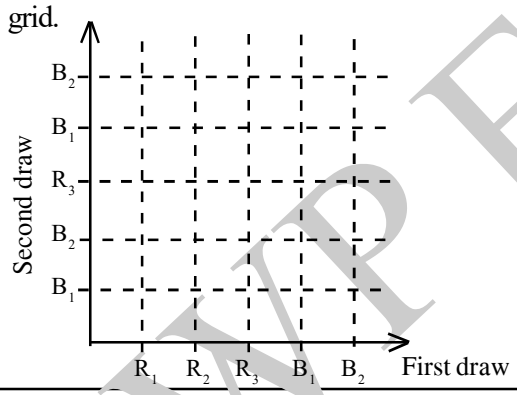
Selecting a bag Selecting a bulbs



(ii) A bulb is taken randomly from the selected bag. Extend the tree diagram to represent the selected. bulb being red or blue bulb.

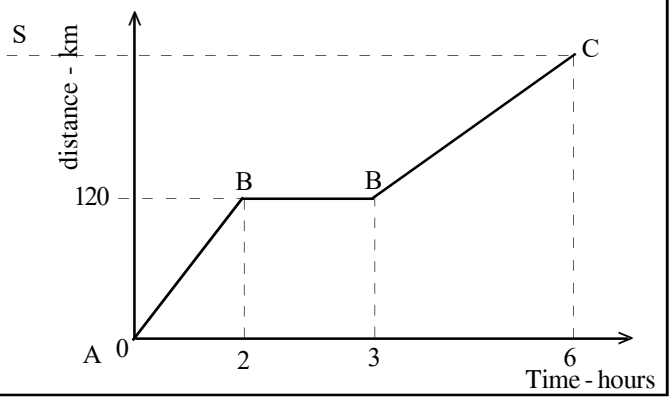
(iii) Find the probability of taking a red bulb, using the tree diagram.

(b) (i) A bulb is taken randomly from the bag B. Its colour is recorded and put back in the bag. A bulb is randomly taken from the same bag again and its colour is recorded. Show the sample space in the grid.



(ii) Enclose the event of obtaining 2 bulbs of the same colour at the 2 draws and write down the probability of it.

(5) *(a)* A certain train travelled in a uniform speed from the station A to B and stopped 1 hour in the station B. After that it travells to the station C. A distance time graph of the motion of a train is given below.



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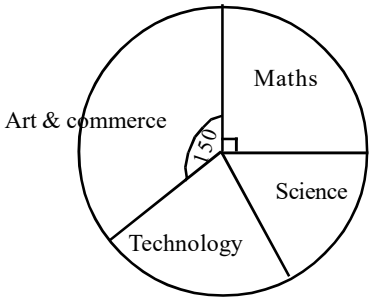
(i) Find the speed from station A to station B

(ii) If it travels from the station B to station C, with the speed of 40 kmh^{-1}, calculate the distance. between two stations of B and C.

Fill the blank (S) on the given graphs.

(b) The pie chart depicting the way of A/L students select subject as Art and commerce, Maths, Science and Technology. Equal number of students are selected Science and Technology.



(i) Find the angle at the centre of the sector which denotes science.

(ii) If 30 students are selected for maths, Calculate the total number of students.

(iii) 6 students who had selected maths changed their subject to science. Find the angle at the centre of the sector corresponding to the subject maths in a new pie chart that is drawn based on the changed data.

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First Term Test - Grade 11 - 2020

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Name/Index No:- ..... **Mathematics - II** **Time:- 3 hours 10 min.**

- **Answer ten questions selecting five questions from part A and five questions from part B.**
- **Each question carries 10 marks.**
- **The volume of a cylinder of base radius r and height *h* is $\pi r^2 h$ and the volume of a sphere of radius *r* is $\frac{4}{3}\pi r^3$.**

Part A

(1) (*a*) An incomplete table of values prepared to draw the graph of the function $y = 7 - x^2$ is given below.

x	-3	-2	-1	0	1	2	3
y	-2	3	.....	7	6	3	-2

(i) Find the value of y when $x = -1$.

(ii) By taking 10 small divisions along the *x* axis and *y* axis as one unit, draw the graph of the above function.

(*b*) (i) Write the maximum value of the function.

(ii) Write the coordinates of the vertex point.

(iii) Write the interval values of *x* for which $y > 0$.

(iv) Write down the equation of the graph which is obtained when the above graph is shifted downwards by 2 units.

(2) A businessman imports 500 sports items worth Rs. 120 per each. When importing above items, customs duty of 30% of the value of items and extra amount of Rs. 12 000 have to be paid. If he want to make a profit of 40% by selling all the above sports items, show that the one item should be sold more than Rs. 250

(3) (i) By using the expansion of $(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$, find the value of 102^3.

(ii) Slove. $\frac{3}{x} - \frac{2}{x+1} = 2$

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(4) (*a*) Simplify.

$$\sqrt[3]{x^{-5/2}} \times \sqrt[6]{x^5}$$

(*b*) The price of a CR book having large number of pages is Rs. 130 and the price of a CR book having small number of pages is Rs. 75. Sujeewa buys 14 CR books including above two types by paying Rs. 1380.

(i) Construct a pair of simultaneous equation by considering the number of CR books having large number of pages that Sujeewa bought as "a" and the number of CR books having small number of pages that he bought as "b".

(ii) By solving it, find seperately the number of CR books having large number of pages and the number of CR books having small number of pages that Sujeewa bought.

(5) Following table represents the expenditure of 30 students for food per day who are studying in an institute of higher education.

Expenditure per day (Rs)	50 - 100	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350	350 - 400
Number of students	1	4	5	8	6	4	2

(i) Write the modal class.

(ii) Find the mean amount of expenditure for a student of that day to the nearest multiple of 10.

(iii) If one student has participated 25 days for studying, show that the expenditure of him for food exceeds Rs. 5700.

(6) (*a*) A scale diagram is drawn to denote the location of the office, the laboratory and the library of a school premises. In the scale diagram the distance between the office and the library is 4.5 cm and the actual distance between the office and the library is 45 m.

(i) Denote the scale which used to draw the scale diagram as a ratio.

(ii) If the actual distance between the office and the laboratory is 37.5 m, find the distance between them that has to be represented in the scale diagram.

(*b*) There are two vertical buildings as AB and CD located at 50m away from each other. A and C are the points on the top of the above two buildings respectively. A person abserves the top of the building AB at an angle of elevation of 35^0 from a window which is situated at the building CD. The window is located at a height of 50m above the ground level at C.

(i) Represent this information in a sketch.

(ii) Draw a scale diagram by using the scale 1 : 1000 and find the actual height of the building AB.

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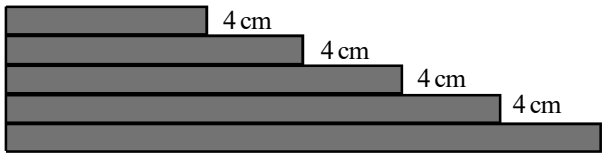
Part B

(7) A student keeps the following pieces of ribbon in ascending order to make a decoration. The difference between two consecutive pieces of ribbon is 4cm and the length of the fifth piece of ribbon is 24 cm.



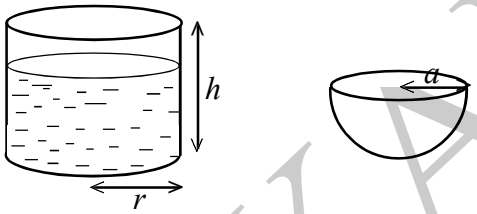
(i) The length of the above pieces are the terms of an arithmetic progression. By using the formulae find the length of the first piece of ribbon.

(ii) Find the length of 12th piece of ribbon.

(iii) Show that the ribbon of length 4m, is sufficient to cut 12 pieces of ribbon for the above decoration.

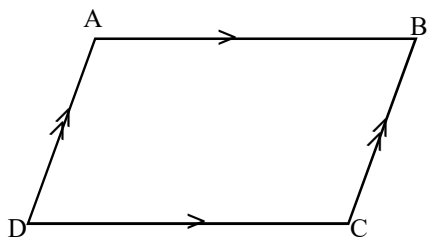
(iv) Another piece of ribbon of length 164 cm is joined to the remaining piece of above ribbon. Then another 3 pieces are cut using that whole ribbon such that the difference between two consecutive pieces are more than the difference between above two consecutive pieces. Accordingly find the difference between two consecutive pieces of ribbon that is newly cut.

(8) (i) $\frac{2}{3}$ of a right cylindrical container of radius r and height h is filled with water. Then a hemi spherical container of radius "a" is completely filled by using the water in the above vessel. Show that the radius of hemi spherical container is $a = \sqrt[3]{r^2 h}$.



(ii) When $r^2 = 1.75cm$ and h = 12 cm, find the radius of hemispherical container (a) using logarithms table.

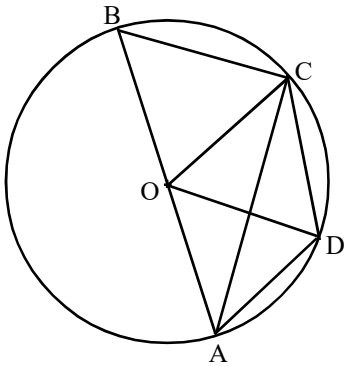
(9) In the parallelogram ABCD, the side BC is produced to P such that BC = CP. The produced BA and the produced PD lines are meet at Q.



(i) Copy this figure on your answer script and by including above data prove that ADQ $\Delta \equiv$ DCP Δ

(ii) Prove that AB = $\frac{1}{2}$BQ

(10) O is the centre of the circle with diameter AB. The points C and D lie on the circle and $C\hat{A}D = 20^0$



(*a*) By giving reasons find the magnitude of each of the following angles

(i) $C\hat{O}D$ (ii) $O\hat{C}D$

(*b*) If the angle $O\hat{A}D$ is bisected by the line AC,

(i) Show that OC // AD

(ii) Prove that the $B\hat{O}D$ is bisected by OC.

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(11) Use only a straight edge with a cm/mm scale and a pair of compasses for the following constructions. Show the construction lines clearly.

(i) Draw a straight line segment AB = 8.5 cm and construct its perprndicular bisector and name the point it meets the AB as D.

(ii) Construct $B\hat{A}O = 30^0$, such that O lies on the above perpendicular bisector.

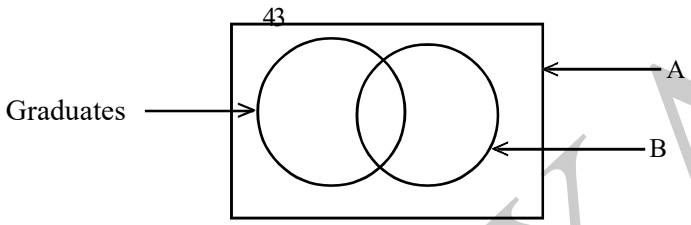
(iii) Construct the circle with centre O and radius OD and name the point which produced AO meets the circle as C.

(iv) Construct a straight line segment which is parallel to AB through C.

(v) By giving reasons show that AD = DC

(12) (a) In the two sets of A and B, n (A) = 17, n (B) = 15, n ($A \cap B$) = 8. Write a relationship among n (A), n (B), n ($A \cap B$) and n($A \cup B$) and then find the value of n($A \cup B$)

(b) 43 candidates passed from a competitive exam which was held to recruit PT instructors for a sports society. The sports society hopes to recruit 30 out of them after examining the qualifications. 26 of candidates who passed the exam have all island sports certificates and 31 candidates are graduates. 10 condidates have not completed the above two qualifications. Following is an incomplete venn diagram used to denote the above information.



(i) Copy the venn diagram on your answer script and name A and B.

(ii) Complete the venn diagram using the above data.

(iii) Shade the region which the candidates who have only all island sports certificates although they passed the competitive exam.

(iv) If the candidates with all 3 qualifications will be recruited as PT instructors, how many candidates can be recruited

(v) What percentage of the candidates have all three qualifications out of the candidates which the sports society hopes to recruit?

NWP EXAM

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Answer

වයඹ පළාත් අධ්‍යාපන දෙපාර්තමේන්තුව

Provincial Department of Education - NWP

32	S	I-II

පළමු වාර පරීක්ෂණය - 11 ශ්‍රේණිය - 2020

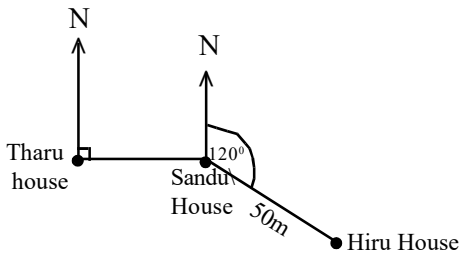
First Term Test - Grade 11 - 2020

Mathematics - Marking scheme

Part I

Part A

(1) 3.7		02
(2) $x = 110^0$		02
$x = 180 - (35 + 35)$ or	01	
marking 35^0 on the diagram		
(3) 11 cm		02
(4) $10^3 = b$		02
(5) $\frac{6}{15}$ or $\frac{2}{5}$	02	
(6) $x = 8$		02
$x - 1 = 7$	01	
(7) 24 cm		02
indentifying DX = 6cm and CX = 8	01	
(8) $\frac{7x-5}{10}$		02
$\frac{2x+5x-5}{10}$ correct denominator or numerator		01
(9) $x = 140^0$	01	
$y = 20^0$	01	02
(10) OC $\perp$ AB		02
(11) Area= 10.5×20		
$= 210\ cm^2$		02
(12) $x + y = 6$		02
Obtaining $3x + 3y = 18$	01	
(13) Gradient = 2		02
$\frac{5-1}{2-0}$ or $\frac{y_2 - y_1}{x_2 - x_1}$	01	
(14) $D\hat{X}C = 100^0$		02
$B\hat{A}X = 40^0$ or $A\hat{C}D = 40^0$ $A\hat{X}B = 100^0$ or		
Obtaining $A\hat{X}D = 80^0$	01	
(15) Volume of water $= 240\ell$		02
(16) $12x^2y$		02
(17) Volume $= 8.5 \times 30$	01	
$= 255cm^2$	01	02
(18) Precentage of rate = 4%		02
$= \frac{2400}{60000} \times 100\%$	01	
(19) (i) ✓	01	
(ii) ✓	01	02
(20)		



Marking correct bearing	01	
Marking 50m	01	02

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(21)

Mid value	10	14
Diaviation	-4,	+4

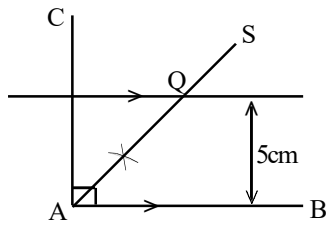
---------- 01
---------- 01 02

(22) $(x + 8)(x - 8)$ ---------- 02
$x^2 - 8^2$ ---------- 01

(23) $(A \cup B)' = \{6, 1\}$ ---------- 02

(24) $x = 140^0$ ---------- 01
$y = 20^0$ ---------- 01 02

(25)



Marking parallel lines and 5cm ---------- 02

Part B

(1) (*a*) No. of man days for $\frac{2}{3}$ of the work

$= 60 \times \frac{2}{3}$ ------- 01

$= 40$ ---------- 01

No of men $= \frac{40}{5} = 8$ ---------- 01 03

(b) (i) Remaining amount after the donation

$= 1 - \frac{1}{8}$

$= \frac{7}{8}$ ---------- 01 01

(ii) Amount for the business

$= \frac{7}{8} \times \frac{4}{7}$ ----- 01

$= \frac{1}{2}$ --------- 01 02

No marks for the equivalent fraction

(iii) Remainder $= 1 - \left(\frac{1}{8} + \frac{1}{2}\right)$ ------ 01

$= 1 - \left(\frac{1+4}{8}\right)$

$= 1 - \frac{5}{8}$

$= \frac{3}{8}$ ---------- 01 02

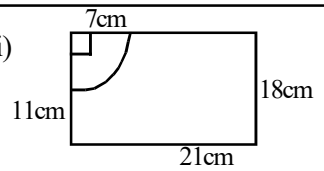
Total amount $= \frac{3}{8} \rightarrow 60000$

$= \frac{60000}{3} \times 8$ ---------- 01

$=$ Rs.160 000 ---------- 01 02

---------- 10

(2) (i)



representing on the diagram ---------- 01
marking 7 cm as the radius ---------- 01 02

(ii) arc length $= 2 \times \frac{22}{7} \times 7 \times \frac{1}{4}$ --------- 01

$=$ 11 cm ---------- 01 02

(iii) Area of the remaining portion

$= 21 \times 18 - \frac{22}{7} \times 7 \times 7 \times \frac{1}{4}$ -------- 02

$=$ 378 - 38.5 ---------- 01

$=$ 339.5 cm^2 ---------- 01 04

(iv) Perimeter = 11 + 21 + 18 + 14 + 11 ------

No of nails $= \frac{75}{5}$ ---------- 01

$= 5$ ---------- 01 02

---------- 10

(3) (a) (i) Rate for the year $= 560 \times 4$ ------- 01

$=$ Rs. 2240 ---- 01 02

(ii)

Assessed value $= \frac{100}{4} \times 2240$ 01

$=$ Rs. 56 000 ----- 01 02

(b) (i) Annual income $= 40000 \times 12$

$=$ Rs. 480 000 - 01

(ii) Total income $= 480000 + 670000$

$=$ Rs. 1 150 000 --- 01

Incom tax for the second 500000

$= \frac{4}{100} \times 500000$ ---- 01

$=$ Rs. 20 000 -------- 01

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tax for the remaining income

$= \frac{8}{100} \times 150000$

= Rs. 12 000 ---------- 01

Total income tax

= 20000 + 12000

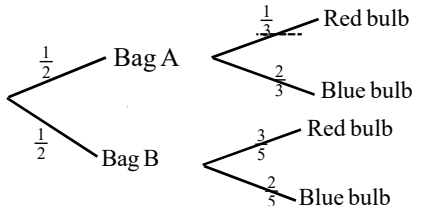
= Rs. 32000 ---------- 01 | 06

---------- 10

(4) (a) (i)

Slecting a bag

Slecting a bulb



01

01

01 | 03

(ii) $\left(\frac{1}{2} \times \frac{1}{3}\right) + \left(\frac{1}{2} \times \frac{3}{5}\right)$ ---------- 01

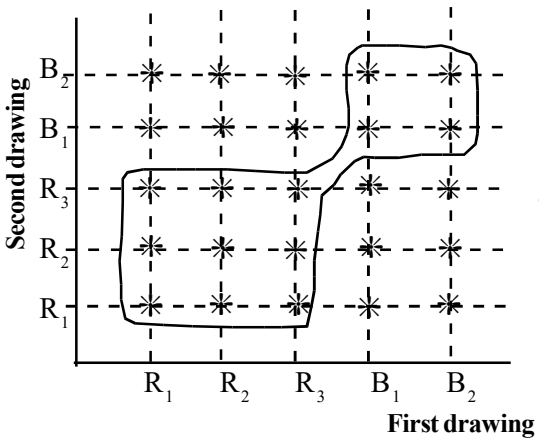
$\frac{1}{6} + \frac{3}{10}$

$\frac{5+9}{30}$ ---------- 01

$\frac{14}{30}$

$\frac{7}{15}$ ---------- 01 | 03

(b)



02

Enclosing the event ---------- 01

Probability - $\frac{13}{25}$ ---------- 01 | 04

---------- 10

(5) (a) (i) Speed $= \frac{120}{2}$ ---------- 01

$= 60\ kmh^{-1}$ ---------- 01 | 02

(ii) Distance $= 40 \times 3$

= 120 km ---------- 01

Marking using a dotted line on the graph --- 01 | 02

(b) (i) = 360 - (150 + 90) ---------- 01

= 360 - 240

$= \frac{120}{2}$

$= 60^0$ ---------- 01 | 02

(ii) total no. of students $= \frac{30}{90} \times 360$ - 01

= 120 --------- 01 | 02

(iii) No. of students = 30 - 6

= 24

angle of the centre $= \frac{24}{120} \times 360$ 01

= 72 ---------- 01 | 02

---------- 10

Paper II

Part A

(1) (a) (i) y = 6 ---------- 01

(ii) Correct axes ---------- 01

Marking points ---------- 01

Smooth curve ---------- 01 - 03

(b) (i) 7 ---------- 01

(ii) (0,7) ---------- 01

(iii) $-2.6 < x < 2.6$ ---------- 02

(iv) $y = 5 - x^2$ ---------- 02 - 06

---------- 10

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(2) (i) Imported worth $= 120 \times 500$ ---- 01

$= $ Rs. 60 000 ---- 01

Worth, after paying the duty

$= \frac{130}{100} \times 60000$ ------ 01

$= 78\ 000$ ---------- 01

Total expenditure $= 78\ 000 + 12\ 000$

$= 90\ 000$ ---------- 01

Selling price $= \frac{140}{100} \times 90000$ ------ 01

$= 126\ 000$ ---------- 01

$= \frac{126000}{100500} \times 90000$ -- 01

$= 252$ ---------- 01

$= 252 > 250$ ---------- 01

---------- 10

(3) (i) $(100 + 2)^3$

$100^3 + 3 \times 100^2 \times 2 + 3 \times 100 \times 2^2 + 2^3$ --- 02

$1000000 + 60000 + 1200 + 8$ ---------- 01

1061208 ---------- 01 04

(ii) $\frac{3}{x} - \frac{2}{x+1} = 2$

$\frac{3x+3-2x}{x(x+1)} = 2$ ---------- 01

$2x^2 + 2x = x + 3$ ---------- 01

$2x^2 + 2x - x - 3 = 0$

$2x^2 + x - 3 = 0$ ---------- 01

$2x^2 + 3x - 2x - 3 = 0$

$x(2x + 3) - 1(2x + 3) = 0$

$(2x + 3)(x - 1) = 0$ ---------- 01

$2x + 3 = 0$ or $x - 1 = 0$ ---------- 01

$x = \frac{-3}{2}$ or $x = 1$ ---------- 01 06

$x = -1.5$

---------- 10

(4) (a) $\sqrt[3]{x^{-5/2}} \times \sqrt[6]{x^5}$

$\left(x^{\frac{-5}{2}}\right)^{\frac{1}{3}} \times \left(x^5\right)^{\frac{1}{6}}$ ---------- 01

$x^{\frac{-5}{6}} \times x^{\frac{5}{6}}$ ---------- 01

x^0 ---------- 01

1 ---------- 01 04

(b) No. of large CR books $= a$

No. of small CR books $= b$

$a + b = 14$ ------- (1) ---------- 01

$130a + 75b = 1380$ ---- (2) ---------- 01

(1) $\times 75$

$75a + 75b = 1050$ ---- (3)

(2) - (3)

$55a = 330$ ---------- 01

$a = 6$ ---------- 01

Substituting $a = 6$ for (1)

$a + b = 14$

$6 + b = 14$

$b = 14 - 6$

$b = 8$ ---------- 01

No of large CR books = 6

No of small CR books = 8 ---------- 01 - 06

---------- 10

(5) (i) 200 - 250 ---------- 01

Mid value	Frequency (f)	fx
75	1	75
125	4	500
175	5	875
225	8	1800
275	6	1650
825	4	1300
375	2	750
	30	6950

Mid value coloumn ---------- 01

fx column ---------- 01

6950 ---------- 01

mean $= \frac{\varepsilon fx}{\varepsilon f}$

$= \frac{6.950}{30}$ ---------- 01

$= 231.6$ ---------- 01

$=$ Rs. 230 ---------- 01 - 06

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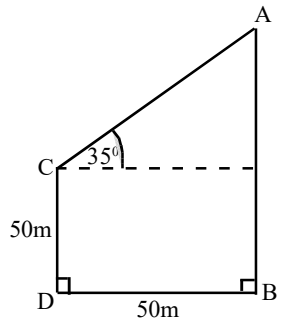
(iii) Expenditure for 25 days. $= 230 \times 25$ -------- 01
$= \text{Rs. } 5750$ -------- 01
$= 5750 > 5700$ ---- 01 - 03
---------- 10

(6) (a) (i) 1 : 1000 ---------- 02
(ii) 3.75 cm ---------- 02 - 04

(b) (i)



Marking BD or CD as 50m ---------- 01
Correct angle of elevation ---------- 01
Marking $CD \perp BD$ or $AB \perp BD$ ---- 01 - 03

(ii) Correct scale diagram ---------- 01
Height of AB $= 8.6\text{cm } (\pm 0.1)$ -------- 01
$= 8.6 \times 10$
$= 86$ m ---------- 01 - 03
---------- 10

Part B

(7) (i) $T_n = a + (n-1)d$
$24 = a + (5-1)4$ ---------- 01
$24 = a + 16$
$24 - 16 = a$
$8cm = a$ ---------- 01 - 02

(ii) $T_n = a + (n-1)d$
$= 8 + (12-1)4$ ---------- 01
$= 8 + 44$
$= 52$ cm ---------- 01 - 02

(iii) $S_n = \frac{n}{2}(a + \ell)$

$= \frac{12}{2}(8 + 52)$ ---------- 01
$= 6 \times 60$
$= 360$ cm
$400 > 360$ ---------- 01
4m long ribbon is sufficient ---------- 01 - 03

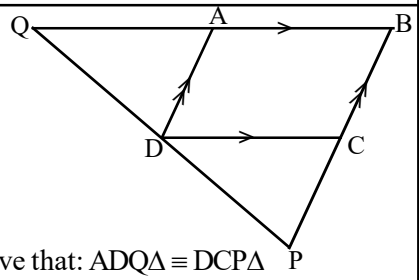
(iv) Extra length. $= 400 - 360$
$= 40$
Total Length $= 40 + 164$
$= 204$cm ---------- 01
$(52 + x) + (52 + 2x) + 52 + 3x = 204$
$156 + 6x = 204$
$6x = 48$ --- 01
$x = 8$cm - 01 - 03
---------- 10

(8) (i) Volume of water in the cylinder $= \pi r^2 h \times \frac{2}{3}$ 01
volume of the hemisphere $= \frac{4}{3}\pi a^3 \times \frac{1}{2}$ --- 01
$= \frac{2}{3}\pi a^3$

$\frac{2}{3}\pi a^3 = \pi r^2 h \times \frac{2}{3}$ ---------- 01
$a^3 = r^2 h$ ---------- 01 - 04
$a = \sqrt[3]{r^2 h}$

(ii) $a = \sqrt[3]{r^2 \times h}$
$= \sqrt[3]{1.75 \times 12}$
$= \frac{1}{3}\lg 1.75 + \frac{1}{3}\lg 12$ ---------- 01
$= \frac{1}{3} \times 0.2430 + \frac{1}{3} \times 1.0792$ ---------- 02
$= 0.0810 + 0.3597$ ---------- 01
$= 0.4407$ ---------- 01
$= antilog\ 0.4407$
$= 2.759$ ---------- 01 - 06
---------- 10

(9) (i)



02

To prove that: $ADQ\Delta \equiv DCP\Delta$
Proof:
AD = BC (opposite sides of a parallelogram)
CP = BC (data)

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$\therefore AD = CP$ ---------- 02

In $ADQ\Delta$ and $DCP\Delta$

$AD = CP$ (above proof)

$A\hat{Q}D = P\hat{D}C$ (corresponding angle) --- 01

$A\hat{D}Q = C\hat{P}D$ (corresponding angle) --- 01

$\therefore ADQ\Delta \equiv DCP\Delta$ (A. A. S) ---------- 01 - 07

(ii) To prove that: $AB = \frac{1}{2}BQ$

Proof: $AB = DC$ (opposite side of the paralllogram) ---- 01

$AQ = DC$ (corresponding elements ---------- 01
of congruent Δ)

$\therefore AB + AQ = BQ$

$2AB = BQ$ ---------- 01 - 03

$AB = \frac{1}{2}BQ$ ----

. 10

(10) (a) (i) $C\hat{O}D = 40^0$

(the angle subtend by the same arc on the cricumference of the circle is half of the angle subtended at the centre of the circle) ---------- 02

(ii) $O\hat{C}D = 180 - 40$ (isosceles Δ)

$= \frac{140}{2}$ ---------- 02 - 04

$= 70^0$

(b) (i) To prove that: OC//AD

Proof: $C\hat{A}D = 20^0$ (data)--(1) ---- 01

$C\hat{A}O = 20^0$ (bisecting) ---------- 01

$A\hat{C}O = 20^0$ (AO = OC)--(2)

(1) = (2)

$\therefore A\hat{C}O = C\hat{A}D$ ---------- 01 - 03

$\therefore AD // OC$

(ii) To prove that:

$B\hat{O}D$ is bisected by OC

Proof: $O\hat{A}D = 40^0$ (20+20) ------ 01

$B\hat{O}C = 40^0$ (corresponding angle) -- 01

$C\hat{O}D = 40^0$ [above proof in (a)]

$\therefore C\hat{O}D = B\hat{O}C$ ---------- 01 - 03

$B\hat{O}D$ is bisected by OC ---------- 10

(11) (i) Constructing AB ---------- 01

Constructing the perpendicular bisector) ------ 02 - 03

(ii) Constructing $B\hat{A}O = 30^0$ ---------- 01

Marking O ---------- 01 - 02

(iii) Constructing the circle ---------- 01

Marking O ---------- 01 - 02

(iv) Constructing the parallel line ---------- 01

(v) $A\hat{O}D = 60^0$(sum of the interior angles of a trinangle is 180^0) ---- 01

$A\hat{C}D = 30^0$

(the angle subtend by the same arc on the cricumference of the circle is half of the angle subtended at the centre of the circle) ---------- 01 - 02

$O\hat{A}D = 30$ (construction)

$\therefore O\hat{A}D = O\hat{C}D$

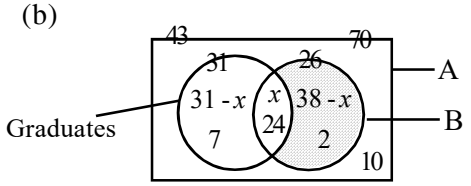
$\therefore AD = CD$ 10

(12) (a) $n(A \cup B) = n(A) + n(B) - n(A \cap B)$ --- 01

$= 17 + 15 - 8$

$= 24$ ---------- 01 02

(b)



(i) A - candidates who pass the exam ---------- 01

B - candidates having all island certificates 01 -- 02

(ii) Marking 31, 26, 10 in the relavent region --------- 01

(iii) Shading the correct region ---------- 01

(iv) $31 - x + x + 26 - x + 10 = 43$

$x = 24$ ---------- 02

(v) $\frac{24}{30} \times 100\%$

80% ---------- 02

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