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Provincial Department of Education - NWP

31 E I

පළමු වාර පරීක්ෂණය - 11 ශ්‍රේණිය - 2018

First Term Test - Grade 11 - 2018

Index No .... **Mathematics I** Time : Three Hours

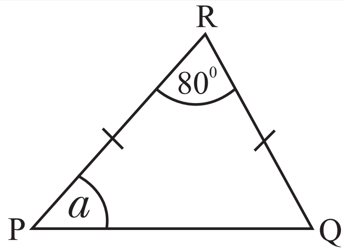
- **Answer all questions**
- **2 marks for each questions of part A and 10 marks for each questions of part B**

Part A

01. Write $2^3 = 8$ in the logarithmic form.

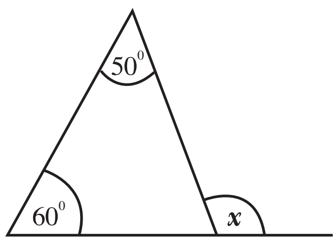
02. Find the total interest to be paid for two years by a person who borrowed Rs. 1000 at 12 % of annual simple interest rate.

03. According to the information given in the figure,
Find the value of a

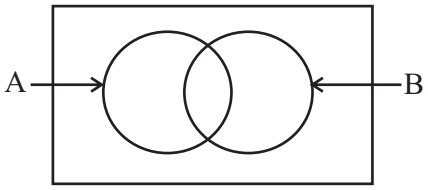


04. Find the distance which can be travelled by a vehicle at the speed of 96 km h^{-1} in 20 minutes.

05. According to the information given in the figure,
Find the value of x



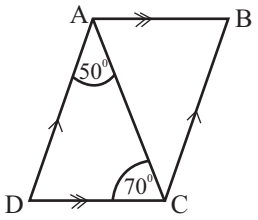
06. Shade the region of $(AUB)'$ in the given Venn diagram.



07. How many days should be worked by 6 men to complete half of the task of draining a cannel which can be completed in 48 men days?

08. Height of a triangular prism with the cross sectional area of $30cm^2$ is 8 cm. Find its volume.

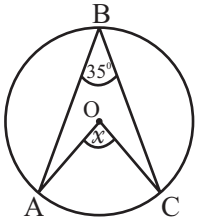
09. Find the magnitude of $A\hat{B}C$ of the parallelogram ABCD.



10. If the probability of obtaining a orange plant which having same features of parent tree from a sample of orange seeds is $^1/_6$. How many orange plants having same features of parent tree can be obtained from 120 seeds?

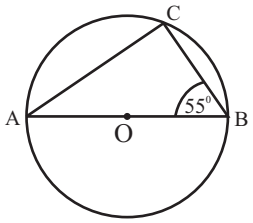
11. Simplify, $\frac{1}{x} - \frac{5}{6x}$

12. Of the given figure, the centre of the circle is O and A, B and C are three points which lie on the circle, find the value of x



13. Solve, $2x + 1 > 9$

14. AB is a diameter of the circle with the centre O. Find the magnitude of $B\hat{A}C$ according to the given data.

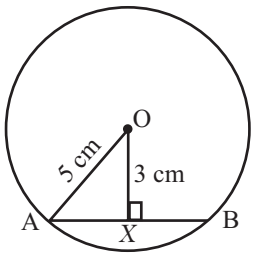


15. Solve, $2(x+3)=10$

16. In which two perfect square numbers does $\sqrt{14}$ exist?
(1) 4 - 9 (2) 9 - 16 (3) 16 - 25

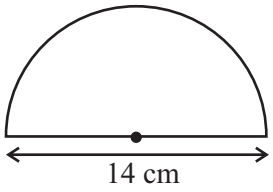
17. The curved surface area of a cylinder with the base circumference 132 cm is 1320 cm^2. Find its height.

18. If the centre of the circle is O, find the length of the chord AB according to the given data.



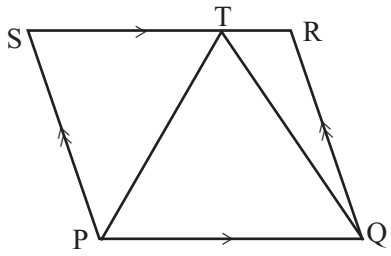
19. Factorize, x^2+5x+6

20. Find the perimeter of the semicircle given in the figure.



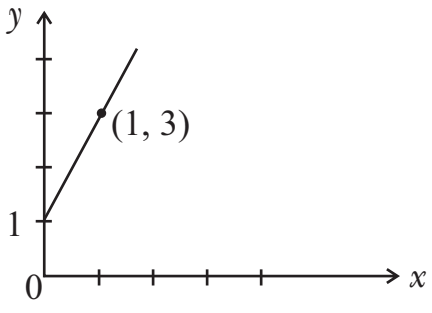
21. Find LCM of, $5x$, $6x^2$, $3xy$

22. The area of the triangle PQT is 13 cm^2. Find the area of the parallelogram PQRS.

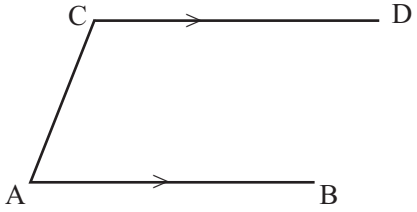


23. The mean weight of 5 children is 54 kg. When another child joins to this group, mean weight is 55 kg. Find the weight of newly joined child.

24. Find the equation of the straight line given in the graph



25. The locus of point equidistant to AB is CD. By using the knowledge on loci, name the point T which lies on CD and equidistant to AB and AC lines.



Part B

01. $^{1}/_{4}$ of a certain set of applicants who applied for the G C E (A/L) teacher appointments have applied for mathematics stream and half of remaining applicants have applied for biology stream.

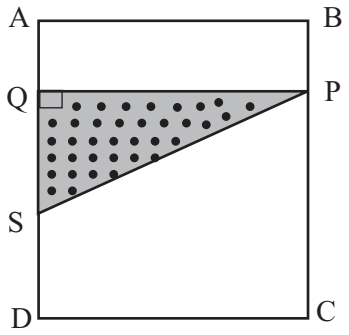
i. What is the fraction of applicants applied for the biology stream?

ii. If number of applicants who applied for the biology stream is 42. What is the total number of applicants applied for the teaching appointments?

iii. If $^{2}/_{3}$ of applicants who do not applied for the mathematics or biology streams qualified for the technology stream, what is the fraction of applicants applied for the technology stream?

iv. After selecting for above three streams, remaining 14 applicants can be selected for the art stream. $^{1}/_{7}$ of applicants who selected for the technology stream are qualified for the art stream, Therefore, those applicants are appointed in the art stream. What is the number of applicants appointed in art stream now?

02. A paper with the length of 29 cm and the breadth of 21 cm is shown in the figure. According to the figure given, a cover page have been prepared by using colured shapes.



i. What is the geometric shape of the part PCDS?

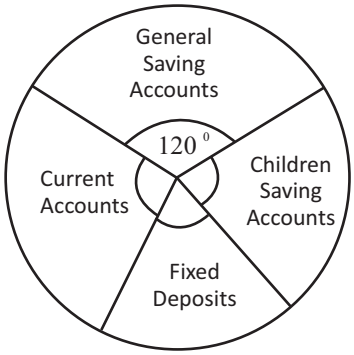
ii. Mark a sector in above figure with the centre C, with centre angle of 90^{0} and with the radius 14 cm. find its arc length.

iii. If AQ = QS and SD = 9 cm, find the area of the triangle PQS.

iv. If one colure is used for both triangle and the sector, find the area of the remaining portion.

v. Write the ratio between the area of the remaining portion and the area of the sector.

03. The information about the accounts which are open in a certain state bank for the saving month is shown in the pie-chart given below.



I. What is the fraction of general saving accounts out of total number of accounts?

ii. If the ratio of general saving accounts, children saving accounts and fixed deposit accounts is 10:6:5, find the centre angle of each sectors and mark them in the pie-chart.

iii. If number of fixed deposit accounts is 20, find the total number of accounts open in this month.

iv. Write down the number of current accounts open in this month as a percentage of total number of accounts.

04. a. 6% of annual rate is charged for a business location which is valued Rs, 170 000.

i. Find the rate to be paid for a year.

ii. What is the rate to be paid for a quarter?

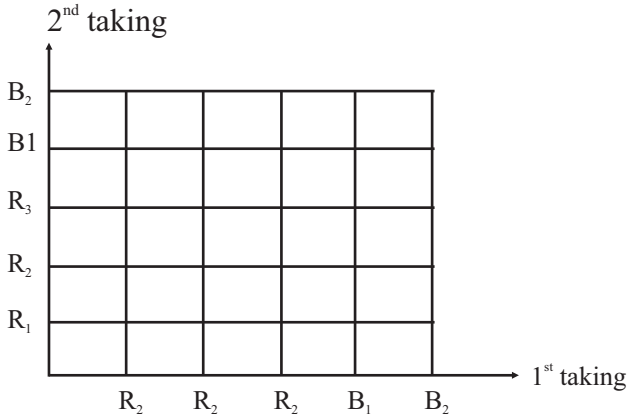
b. Rs. 500 000 of the annual income of this businessmen is tax free. By the government, 4% of income tax is charged for next Rs. 500 000 and 5 % of income tax is charged for next additional income.

I. If his annual income is Rs. 1 250 000, Find the income tax to be paid by him.

ii. Calculate total tax paid by the businessmen for this year.

5. a. Of the identical pencils in the Gayani's pencil box, 3 are in red colur and 2 are in blue colur. One of these pencils is taken randomly and after note down its colur, it is replaced and again one pencil is taken out and checked its colur.

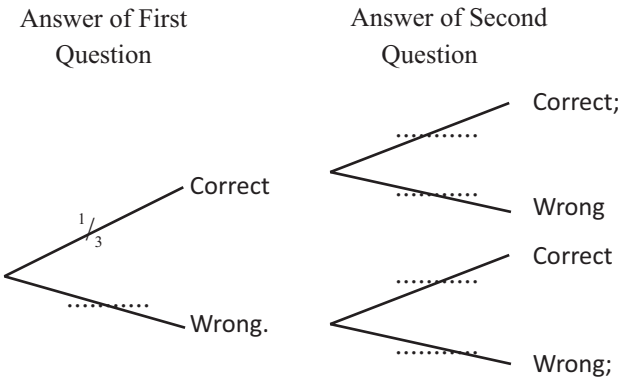
i. Mark all possible outcomes on the following grid.



ii. Circle the event that the both pencils being with different colurs in the grid and find its probability.

b. Two multiple choice questions are given to a student for a quiz competition. 1st question has 3 choices and 2nd question has 4 choices. Only one choice is correct.

i. Complete the given tree diagram according to these information.



ii. Find the probability being two answers are wrong answers

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Provincial Department of Education - NWP

31 E II

පළමු වාර පරීක්ෂණය - 11 ශ්‍රේණිය - 2018

First Term Test - Grade 11 - 2018

Index No ....

Mathematics II

Time : Three Hours

- Answer 5 questions from Part A and 5 questions from Part B.
- Each questions carries 10 marks.
- The volume of a right circular cylinder, with radius of the cross section *r* and height *h*, is $\pi r^2 h$. Volume of a sphere with radius *r* is $^4/_3\ \pi r^3$.

Part A

01. An incomplete value table prepared to draw the graph of the function, $y = x^2 - 5$ is given below

x	-3	-2	-1	0	1	2	3
y	4	-1	-4	------	-4	-1	4

i. When when $x = 0$, find the value of y.
ii. Draw the graph of the function by taking suitable scale for both the x axis and y axis.
By using the graph, answer the following questions,
iii. Write down the coordinates of the turning point.
iv. Find the interval of x for which the function is negative and increasing.
v. By using the value of positive root of x when, y= 0 find the value of $\sqrt{5}$.

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02. Due to an error of a polytheen bags producing machine of a certain factory, polytheen bags with the expected width and polytheen bags without expected width are produced. Information gathered about the width of a selected sample of produced bags are given below.

The width of a bag (units)	5-9	10-14	15-19	20-24	25-29	30-34	35-39
Number of bags	6	10	7	12	7	6	2

i. Find the modal class interval.
ii. Find the mean width of a polytheen bag .
iii. It is revealed that the polytheen bags with the width below the mean width are not suitable for the usage. Calculate the percentage of unsuitable bags for usage.
iv. If 1000 polytheen bags are produced in one hour by the machine. By considering cost of one bag is Rs.60, calculate the lost obtained in one hour.

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03. a. Solve; $\dfrac{3x - 1}{4} = \dfrac{3x + 1}{5}$

b. The price of a office table and a chair is Rs. 21 000. The price of four chairs is Rs. 3000 more than the price of two tables.
i. By taking price of a chair as x and price of table as y, build up a pair of simultaneous equations.
ii. By solving the pair of simultaneous equations, find price of an office table and price of a chair.
iii. If five chairs and five tables are given for the Rs. 100 000, find the discount given for this purchase.

04.

Buy any electric equipment and pay installments wise in 12 months without the interest.

A notice published at a shop is given above. According to this notice, The owner of the shop said that 6% of discount is given for buying a refrigerator priced Rs. 42 000 at the cash price and If it is bought according to the method of hire purchase, It can be purchased by paying $^1/_7$ of its value and balance as 12 equal installments valued Rs. 3060.

i. Find the discount given when the refrigerator is bought at the cash price.
ii. Find the loan amount to be paid when it is bought according to the method of hire purchasing.
iii. It is revealed that some interest is charged when the balance is paid as installments. Write the interest charged as a percentage of the loan amount.

---

05. i. By considering the expansion of $(a+b)^3$, find the value of 101^3
ii. Solve, $\frac{100}{x} - \frac{100}{x+5} = 1$

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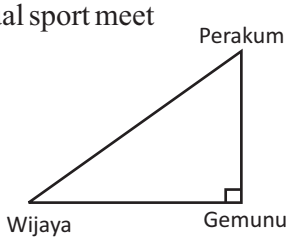
06. a. The way of placing three houses constructed at the playground for the annual sport meet of a certain school is given in the sketch. A student is drawn this according to the scale of 1:25 000.



i. According to the above scale, find the actual distance represented by 1 cm.
ii. If the real distance between Wijaya and Perakum houses is 125 m, find the distnace between these two houses in the scale diagram.

b. At the place B, A man who moves up in a lift from the ground level A observes a child who comes to A at an angle of depression of 50^0. When the child moves 40 m towards A, the child observes the man who stay at B in the lift at the angle of elevation of 70^0.

i. Represent above information in a sketch by considering the location of A and B, and the route of the child.
ii. According to the sketch, draw a scale diagram by representing 10 m by 1 cm.
iii. Find the height AB to the nearest meter by using the scale diagram.

Part B

07. A fan used for a quality checking, rotates 1 round in the first second and it speed up its rotation in each next seconds by rotating 3 rounds more than the number of rounds rotated in previous second. It does not speed up when its rotational speed is 25 rounds per second.

i. Write down the number rounds rotated by the fan in first four seconds.
ii. Write down the number of rounds rotates by the fan in the n^{th} second in terms of n.
iii. Find the time taken to reach maximum rotational speed.
iv. Show the total number of rounds rotated when the fan reaches maximum rotational speed is more than 200.
v. When the power is off, the fan reached maximum rotational speed, stops its rotation in n^{th} second by reducing number of rotating rounds as follows.
25, 23, 21, 19, …… , 1
Find the time taken to stop rotation of the fan after reaching its maximum rotational speed.

---

08. Do the constructions given below using a pair of compasses and a cm/mm scale with a straight edge. Show constructing lines clearly.

i. Construct a straight line segment AB = 9 cm and construct its perpendicular bisector.
ii. Name the point of intersection of perpendicular bisector and the line AB as O, and construct a circle with the centre O and with radius OA.
iii. Construct triangle ABC such that $B\hat{A}C = 30^0$ and C lies on the circle.
iv. Construct OD which is parallel to BC to obtain the point D in the side of AB which C lies.
v. Show that, $A\hat{C}D = \frac{1}{2}\ A\hat{B}C$

9. Two spheres with the diameter a and b are made by melting a solid cylinder with radius a and with height as twice of its radius without wasting metals.

   i. Show that, $b = \sqrt[3]{11}\ a$
   ii. If a = 2cm, find the value of b to the nearest first decimal place by using the logarithmic tables.

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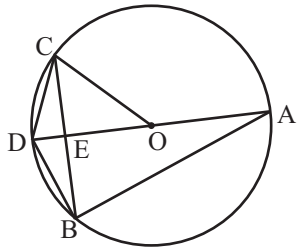
10. Of a circle with the centre O , the diameter is AD and $A\hat{E}B = 90^0$ and $D\hat{O}C = 2x$



   i. Copy the given figure and show that, $D\hat{B}C = B\hat{A}E$
   ii. Show that BCD is an isosceles triangle

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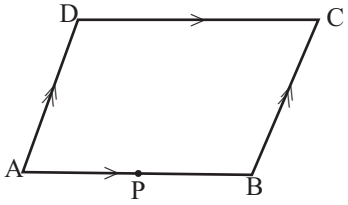
11. P is the midpoint of the side AB of the parallelogram ABCD. Produced lines DP and CB meet at Q and the line drawn parallel to DP through C meets the produced line AB at S. Mark the given data by copying down the figure



   i. Show that APD $\triangle \equiv$ BPQ$\triangle$
   ii. Show that AQBD is a parallelogram
   iii. Show that area of AQD = ½ of area of AQBD

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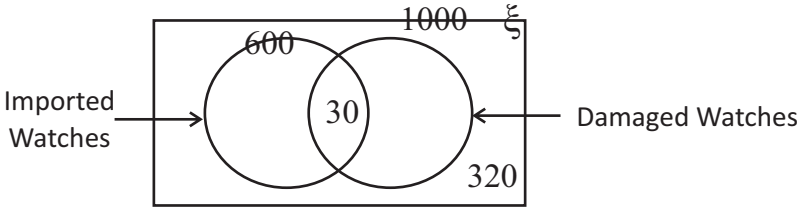
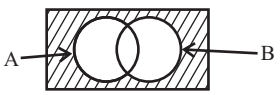
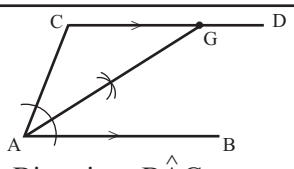
12. There are imported watches and local watches in a show room of a certain shop. In the first check it is revealed that some watches are with damages and these information are represented in the following Venn diagram.



   i. Copy down above Venn diagram and shade the region of the Venn diagram which represents the set of local watches which have not damages.
   ii. Complete the Venn diagram
   iii. Find the number of watches which have not damages by using the Venn diagram.
   iv. When these watches are checked again, it is revealed that all damaged watches are imported ones. According to that, draw the Venn diagram again by rearranging.

1. $Log_2 8 = 3$		2
2. $1000 \times \frac{12}{100} \times 2$ $= 240$	1 1	2
3. $a = 50^0$ $2a = 100$ or $P\hat{Q}R = a$	 1	2
4. $96 \times \frac{20}{60}$ 32 km	1 1	2
5. $x = 110^0$ $x = 60^0 + 50^0$ or Marking 70^0	 1	2
6. 		2
7. 4 Days to obtain 24 man days or 24/6	1	2
8. $240\ cm^3$ 30×8	 1	2
9. 60^0 $A\hat{D}C = 60^0$	 1	2
10. 20 $120 \times \frac{1}{6}$	 1	2
11. $\frac{1}{6x}$ $\frac{6 - 5}{6x}$	 1	2
12. $x = 70^0$ or marking 70^0 on the figure		2
13. $x > 4$ $2x > 8$	 1	2
14. 35^0 $A\hat{C}B = 90^0$	 1	2
15. $x = 2$ $2x + 6 = 10$ or $x + 3 = 5$	 1	2
16. II) 9 - 16		2
17. 10 cm $\frac{1320}{130}$	 1	2
18. AB = 8 cm AX = 4 cm	 1	2

19. $x^2 + 3x + 2x + 6$ $x(x + 3) + 2(x + 3)$ $(x + 3)(x + 2)$	1 1	2
20. $\frac{1}{2} \times 2 \times \frac{22}{7} \times 7 + 14$ 36 cm	1 1	2
21. $30x^2y$ $5x = 5 \times x$ $6x^2 = 2 \times 3 \times x \times x$ $3xy = 3 \times x \times y$	 1	2
22. $26\ cm^2$		2
23. 60 kg 330 - 270	 1	2
24. $y = 2x + 1$ $m = 2$ or $\frac{(3 - 1)}{(1 - 0)}$	 1	2
25.  Bisecting $B\hat{A}C$	 1	2

B

01	(i) for Bilogy Stream = $1 - \frac{1}{4}$			
	$= \frac{3}{4} \times \frac{1}{2}$	1		
	$= \frac{3}{8}$	1	2	
	(ii) Total no. of applicants $= \frac{3}{8} \rightarrow 42$	1		
	$= \frac{42}{3} \times 8$			
	$= 112$	1	2	
	(iii) For the technology stream $= 1 - (\frac{1}{4} + \frac{3}{8})$	1		
	$= \frac{3}{8}$	1		
	$= \frac{3}{8} \times \frac{2}{3}$	1		
	$= \frac{1}{4}$	1	4	
	(iv) For the art stream $= 112 \times \frac{1}{4}$			
	$= 28 \times \frac{1}{7}$			
	$= 4$	1		
	$= 14 + 4$			
	$= 18$	1	2	10

02 (i) Trapizium — 1

(ii) Arc length $= \frac{1}{4} \times 2 \times \frac{22}{7} \times 14$ — 1

$= 22$ cm — 1

Rough Sketch, marking 14 or 22 — 1 — 3

(iii) PQS $\rightarrow$ $= \frac{1}{2} \times 10 \times 14$ — 1

$= 105\ cm^2$ — 1 — 2

(iv) Area of Remaining Portion

$= (29 \times 21) - (\frac{1}{4} \times \frac{22}{7} \times 14 \times 14 + 105)$ — 2

$= 609 - (154+105)$

$= 609 - 259$

$= 350\ cm^2$ — 1 — 3

(v) $350 : 154$

$25 : 11$ — 1 — 10

03 (i) $\frac{1}{3}$ or $\frac{120}{360}$ — 1

(ii) Children $= \frac{120}{10} \times 6$

Savings $= 72$ — 1

Fixed Deposits $= \frac{120}{10} \times 5 = 60$ — 1

Current Accounts $= 360 - (60+72+120)$

$= 108$ — 1

Marking in pie chart — 1 — 4

(iii) Total no. of Accounts $= \frac{20}{60} \times 360$ — 1

$= 120$ — 1 — 2

(iv) Percentage $= \frac{108}{360} \times 100\%$ — 1+1

$= 30\%$ — 1 — 3 — 10

04 (a) (i) Annual Rate $= \frac{6}{100} \times 170000$ — 1

$= $ Rs. 10200 — 1 — 2

(ii) Rate per a quarter $= \frac{10200}{4}$ — 1

$= $ Rs. 2550 — 1 — 2

(b) (i) First Rs 500000 $= \frac{4}{100} \times 500000$ — 1

$= 20000$ — 1

Balance $= 750000 - 500000$

$= 250000$ — 1

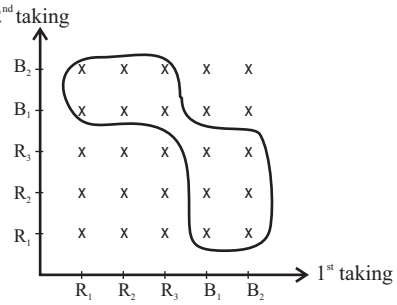
Income Tax $= \frac{5}{100} \times 250000$ — 1

$= 12500$ — 1

(ii) Total Amount of money $= 20000 + 12500 + 10200$

$= 42700$ — 1 — 6 — 10

05 (i) 2nd taking

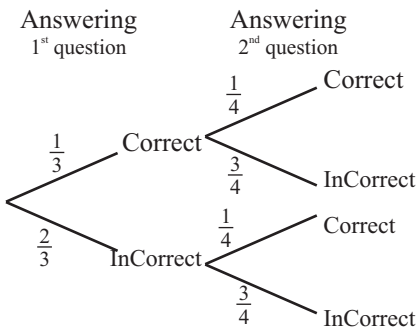


— 2

(ii) To mark event — 2

$\frac{12}{25}$ — 1 — 5

(b)



— 3

(ii) $\frac{2}{3} \times \frac{3}{4}$

$\frac{1}{2}$ — 2 — 5 — 10

Part II

01 (i) (-5) — 1 — 1

(ii) Drawing correct Axes — 1

Marking at least 6 points — 1

Smooth Curve — 1 — 3

(iii) (0,-5) — 1 — 1

(iv) $0 < X < 2.2$ — 1+1 — 2

(v) $y = 0$, Positive root

2.2 (~~→~~0.1) — 1

$X = \overline{~~5~~}$ — 1

$\overline{~~5~~} = 2.2$ (~~→~~0.1) — 1 — 3 — 10

02 (i) 20 - 24 — 1 — 1

(ii) mid value column — 1

fd / *fx* Columns — 1

~~→~~*fd* / ~~→~~*fx* — 1

mean $= \frac{1000}{50}$ — 1

$= 20$ — 1 — 5

(iii) $\frac{23}{50} \times 100\%$ — 1

46% — 1 — 2

(iv) $10000 \times \frac{46}{100} \times 0.60$ — 1

$= $ Rs. 26400 — 1 — 2 — 10

03 (i) $\frac{3x-1}{4} = \frac{3x+1}{5}$

$15x - 5 = 12x + 4$ — 1

$3x = 9$ — 1

$x = 3$ — 1 — 3

(b)(i) $x + y = 21000$ ------①

$4x - 2y = 3000$ ------① — 1

(ii) ①x2

$2x + 2y = 42000$ ----① — 1

①+①

$6x + 45000$

$x = 7500$ — 1

$x = 7500$ Subtitute on ①

$x + y = 21000$

$7500 + y = 21000$ — 1

$y = 13500$ — 1 — 5

(ii) Discount $= 21000 \times 5$ — 1

$= 105000$

$= 105000 - 100000$

$=$ Rs.5000 — 1 — 2 — 10

04 Discount $= \frac{6}{100} \times 42000$ — 1

$=$ Rs. 2520 — 1 — 2

Total Amount $= 3060 \times 12$ — 1

paid $=$ Rs. 36720 — 1 — 2

Loan Amount $= 42000 \times \frac{6}{7}$ — 1

$=$ Rs. 36000 — 1

For Stationaries $= 36720 - 36000$

$=$ Rs. 720 — 1

Percentage $= \frac{720}{36000} \times 100\%$ — 2

$= 2\%$ — 1 — 6 — 10

05 (i) $(101)^3$

$(100+1)^3$ — 1

$100^3 + 3 \times 100^2 \times 1 + 3 \times 100 \times 1^2 + 1^3$ — 1

1030301 — 1 — 3

(ii) $\frac{100}{x} - \frac{100}{x+5} = 1$

$\frac{100(x+5) - 100x}{x(x+5)} = 1$ — 1

$100x + 500 - 100x = x^2 + 5x$ — 1

$x^2 + 5x - 500 = 0$ — 1

$(x+25)(x-20) = 0$ — 2

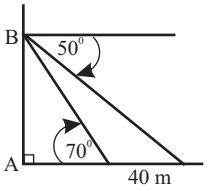
$x + 25 = 0$ or $x - 20 = 0$

$x = -25$ $x = 20$ — 2 — 7 — 10

06 (a) (i) 25 m — 1

(ii) 5 cm — 1 — 2

(b) (i)



for the sketch — 2

(ii) Correct scale diagram — 4

(ii) AB $=$ __ x 10 — 1

$=$ ___m — 1 — 8 — 10

07 (i) 1, 4, 7..... — 1 — 1

(ii) $T_n = a + (n-1)d$

$T_n = 1 + (n-1)3$ — 1

$T_n = 3n - 2$ — 1 — 2

(iii) $25 = 1 + (n-1)3$ — 1

$25 + 2 = 3n$

$27 = 3n$

$9 = n$ — 1 — 2

(iv) $S_n = \frac{n}{2}\{2a + (n-1)d\}$

$= \frac{9}{2}\{2 \times 1 + (9-1)3\}$ — 1

$= \frac{9}{2}(2 + 8 \times 3)$

$= \frac{9}{2}(2 + 24)$ — 1

$= \frac{9}{2} \times 26^{13}$

$= 207$

$= 200 < 207$ — 1 — 3

(v) $1 = 25 + (n-1)-2$ — 1

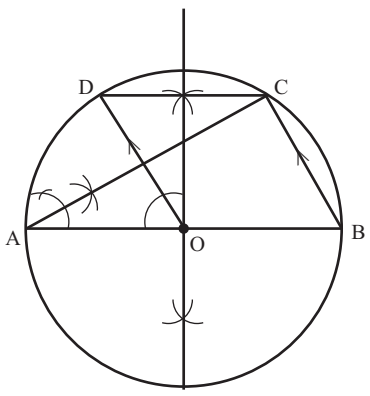
$1 = 25 - 2n + 2$

$1 - 27 = -2n$

$-26 = -2n$

$13 = n$ — 1 — 2 — 10

08 (i)



Constructing AB — 1

Constructing perpendicular bisector — 1 — 2

(ii) Marking O — 1

Constructing Circle — 1 — 2

(iii) Constructing $B\hat{A}C = 30^0$ — 1

Completing ABC → — 1 — 2

(iv) Constructing line OD parallel to BC — 1 — 1

(v) $A\hat{O}D = A\hat{B}C$ (Corresponding $\measuredangle$s) 1

$A\hat{O}D = 2A\hat{C}D$ (Angle Subtended on the circle =1/2 of angle subtended at the centre) 1 2

$\rightarrow 2A\hat{C}D = A\hat{B}C$

$A\hat{C}D = \frac{1}{2}A\hat{B}C$ 1 1 10

09 (i) $\pi \times a^2 \times 2a = \frac{4}{3}\pi \times \frac{a}{8} + \frac{4}{3}\pi \times \frac{b^3}{8}$ 1

$2a^3 = \frac{a^3}{6} + \frac{b^3}{6}$ 1

$2a^3 - \frac{a^3}{6} = \frac{b^3}{6}$ 1

$\frac{12a^3 - a^3}{6} = \frac{b^3}{6}$

$11a^3 = b^3$ 1 4

$\sqrt[3]{11}\, a = b$

(ii) $b = \sqrt[3]{11} \times 2$

$b = \frac{1}{3}\log 11 + \log 2$ 1

$= \frac{1}{3} \times 1.0414 + 0.3010$ 2

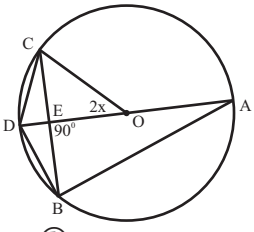
$= 0.34171 + 0.3010$ 1

$= 0.6481$ 1

$= \log 0.6481$

$= 4.447 \quad = 4.4$ 1 6 10

10 (i)



2

$C\hat{B}D = X$ ---- ① (angle subtended on the circle is equal to half of angle subtended at the centre)

$A\hat{B}D = 90^0$ (angle of semi- circle) 1

$A\hat{B}E = 90^0 - x$ 1

$A\hat{E}B = 90^0$ (Data)

$B\hat{A}E = 90^0 - (90^0 - x)$ 1 6

$BAE = x$ --①

① = ①

$B\hat{A}E = C\hat{B}D$

(iii) $C\hat{B}D = x$---① (Proved)

$B\hat{A}D = x$ (Proved) 1

$B\hat{A}D = B\hat{C}D$ (angles of same Segment) 1

$\rightarrow B\hat{C}D = x$ ---①

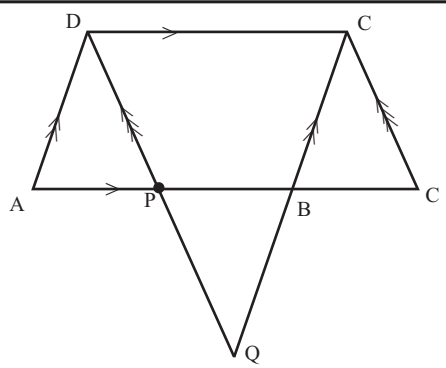
① =①

$\rightarrow C\hat{B}D = B\hat{C}D$ 1

$\rightarrow DC = BD$ 1 4 10

BCD is isosceles triangle

11



2

(i) $A\hat{P}D \rightarrow$ and $B\hat{Q}P \rightarrow$

AP = BP (P mid point)

$A\hat{D}P = P\hat{Q}B$ (alternate angles)

$A\hat{P}D = B\hat{P}Q$ (opposite angles)

$\rightarrow APD \rightarrow\!\!\rightarrow BQP \rightarrow$ (A. A. S.) 3 5

(ii) AP = BP (Data)

PD = PQ (Corresponding sides of congruent $\rightarrow$s) 2 2

$\rightarrow$ AQBD $\square$

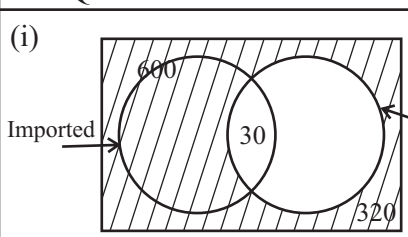
(iii) AQBD$\square$ = ABCD$\square$ } lie on same base and in between same pair of parallel lines.

AQBD$\square$ = 2AQD$\rightarrow$ }

$\rightarrow 2AQD \rightarrow$ = ABCD $\square$

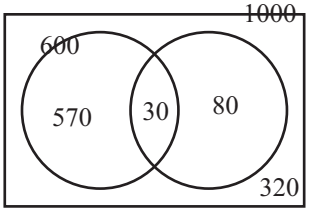
$AQD \rightarrow$ = ½ ABCD$\square$ 3 3 10

12 (i)



2

(ii)

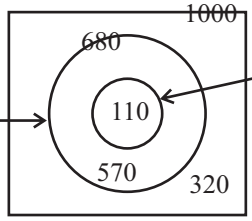


2

Mark 570 and 80 2

(iii) Without damages = 570 + 320

= 890



Venn Diagram 2

for 570 and 680 2 10