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Department of Education, Southern Province

THIRD TERM TEST 2022 / 2023

Grade 11

MATHEMATICS I

6

2 hours

Name / Index Number

PART A

- Answer all the questions in the paper itself.

1. If $m^n = 16$, select the correct relation.

i) $\log_m n = 16$

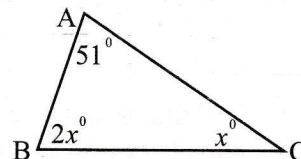
ii) $\log_{16} m = n$

iii) $\log_m 16 = n$

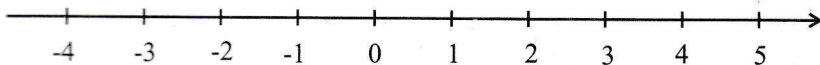
iv) $\log_{16} n = m$

2. Simplify. $\frac{3}{4x} - \frac{1}{6x}$

3. Find the value of $2x^\circ$ by using the information in the figure.



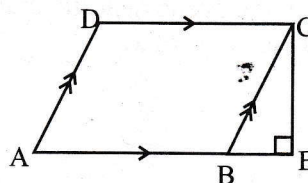
4. Solve the inequality $2x + 1 \leq 3$ and represent all the solutions on a number line.



5. Twelve men finished $\frac{3}{4}$ of a work within 3 days. Find the total work in mendays.

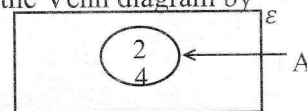
6. If the curved surface area of a cylinder base radius 7 cm is 56π . Find the height of the cylinder.

7. ABCD is a parallelogram. CE is drawn perpendicularly from C to the produced AB. If $\widehat{ADC} = 125^\circ$ find the value of $\widehat{BCE}$



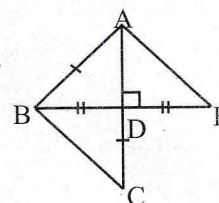
8. Simplify. $4xy \div \frac{1}{2x}$

9. If $B = \{1, 2, 3, 4, 5\}$ represent the set B in the Venn diagram. Complete the Venn diagram by writing the elements.



10. A bus took 45 minutes to travel initial 75km of a journey and 1 hour and 15 minutes to travel next 105 km. Find the average speed of the bus in kilometres per hour.

11. AC and BE perpendicularly intersect at D. $BD = DE$ and $AB = DC$.
Name two congruent triangles and write the case of congruency.



12. The monthly interest payable at the end of a month is Rs.1200 for an amount borrowed at monthly interest rate of 4%. Find the amount borrowed.

13. Find the Least Common Multiple of $6a^2$, $3ab$, a^2b

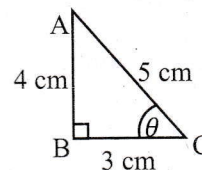
14. The first 8 data of a number distribution of 15 numbers are given below.

15, 17, 18, 18, 20, 21, 24

- Find the median
- Find the first quartile

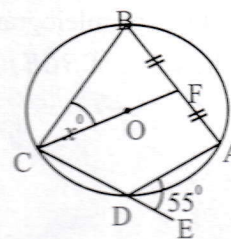
15. Using the information given,

- find $\tan \theta$
- find $\sin(90 - \theta)$



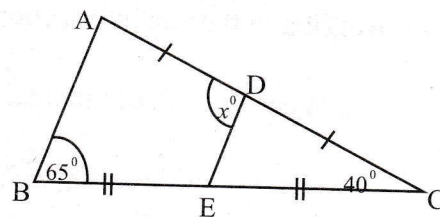
16. Factorize. $n^2 - 13n - 30$

17. O is the centre of the circle in the figure. The side CD is produced to E in the cyclic quadrilateral ABCD. The midpoint of AB is F.
Find the value of x .

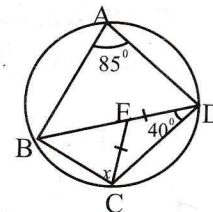


18. Write the 24th term as a power of 2 in the geometric progression 8, 16, 32, ...

19. Find the value of x

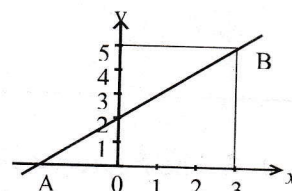


20. A, B, C, D are 4 points on the circle. If $\widehat{BAD} = 85^\circ$, $\widehat{CDE} = 40^\circ$ and $CE = DE$, find the value of x



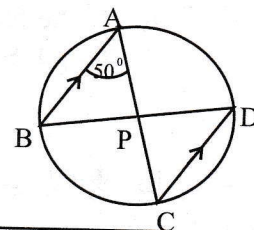
21. Three faces of an unbiased cubic die are painted red, two faces are painted blue and the remaining face is painted in green. Recording the colour of the face which turns up when it is tossing, find the probability of the face turns up is red or green.

22. Write the equation of the straight line given.

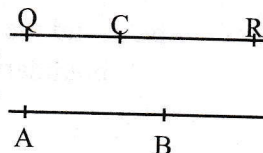


23. A tank of 6000 l capacity completely filled with water. Find the time taken to empty the tank completely using four pumps at a same time which flows water at a uniform rate of 75 l per minute.

24. AB and DC are two parallel chords. AC and BD intersect at P. If $\widehat{BAC} = 50^\circ$ find the value of $\widehat{APD}$



25. QR is a part of the locus of a point moving at a distance of 5.5 cm from AB. C is a point on QR. Draw a rough sketch to find the point P which is on QR which moves equi distance from AC and AB

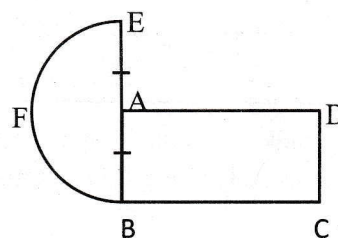


PART B

1. In a garment factory, $\frac{3}{4}$ of the workers are working in the production section and $\frac{1}{7}$ are working in the packing section.

- i. What fraction of the total workers are working in production and packing section?
- ii. 120 workers who are not in the production and packing section are working in other sections. What is the total number of people working in the garment factory?
- iii. If 560 of the total workers working in the production section work in the sewing section and the rest work in the cutting section. What fraction of the total workers working in the garment factory are working in the cutting section?

2. The figure shows a stall of an exhibition consisting of ABCD rectangular section and a BFE semi circular section of diameter BE. AB = 7 m



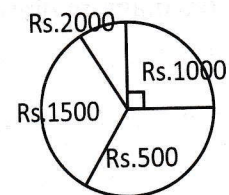
- i. Find the area of the semi circular part.
- ii. If the area of the rectangular part is twice the area of semi circular part, find the length BC
- iii. Find the area of the stall of the exhibition.
- iv. Find the number of flag poles required to fix with 2m gap along the CBFE boundary of the stall of this exhibition.

03. A man invested Rs. 75 000 to buy shares of market price Rs.30, paying a dividend of Rs. 6 per share

- i. How many shares he bought?
- ii. What is the dividend income at the end of the year?
- iii. If all the shares he bought are sold at the end of the year the capital gain is Rs. 325 000, find the selling price of a share.

(b) If Rs. 1890 has to be paid as quarterly rates for a house of annual assessed value Rs. 84 000. Calculate the percentage that the provincial council charged as rates

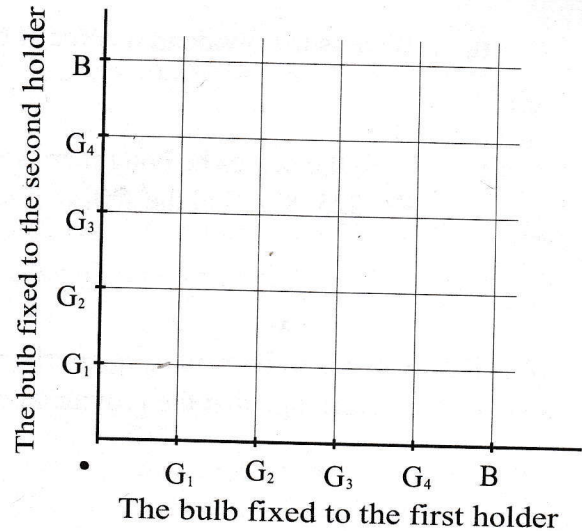
04. Tickets are sold at Rs. 2000, Rs.1500, Rs. 1000 and Rs.500 for a musical show. The following pie chart shows the information about the number of tickets sold in each category.



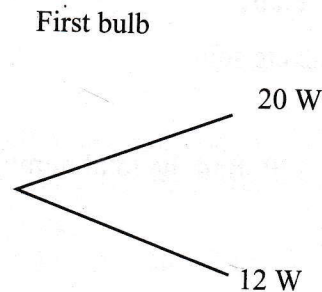
- i. If the number of Rs.1000 tickets sold is 120, find the total number of tickets sold.
- ii. If the number of Rs.2000 tickets sold is 40, find the angle at the centre represented by Rs. 2 000 tickets.
- iii. If the income received from selling Rs. 500 tickets is Rs. 90 000, find the angle at the centre represented by Rs.500
- iv. What is the income received from selling Rs.1500 tickets?

05. In a container, there are four good bulbs of equal shape and size G_1, G_2, G_3, G_4 and a burnt bulb B . Two bulbs are randomly taken from the container and fixed to the holder.

- Represent the sample space containing all possible outcomes for the bulbs taken on the grid.
- Encircle the event that at least one holder has burnt bulb and find its probability.



- (b). Two of these bulbs are 20 Watt (20W) and the rest are 12 Watt (12W). This is an incomplete tree diagram drawn by considering the Watt of the bulbs.



- Mark the probabilities on the branches of the given tree diagram
- Extend the diagram you drew to represent the Watts of the second bulb.
- Find the probability that only one bulb taken out is 20W using the Venn diagram

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Department of Education, Southern Province

YEAR END EVALUATION 2022 / 2023

Grade 11

MATHEMATICS II

3 hours

Name / Index Number

additional 10 minutes to read

Important:

- Answer ten questions selecting five questions from Part A and five questions from Part B.
- Write relevant steps and correct units in answering the questions.
- Each question carries 10 marks.
- The volume of a sphere is $\frac{4}{3}\pi r^3$.

PART A

❖ Answer five questions only.

1. A refrigerator worth Rs. 108 000 can be purchased by making down payment of $\frac{1}{3}$ of its value and paying the rest in 18 equal monthly instalments of Rs. 4950. If the interest is calculated on the reducing balance, find the annual interest rate.

2. An incomplete table to draw the graph of the function of $y = x^2 + 2x - 3$ is given below

x	-4	-3	-2	-1	0	1	2
y	5	0	-3		-3	0	5

- (a) i) Find the value of y when $x = -1$
ii) Draw the graph of the above function on a standard system of axes using a suitable scale
- (b) Using the graph,
i. Write the range of values of x for which the function decreases negatively.
ii. Find the roots of $x(x + 2) = 3$
iii. The above graph is translated down ward by one unit vertically. Write the equation of the new function obtained in the form $y = (x + a)^2 + b$

3. (a) A jeep and a cab were brought for a tourist group of 40 people who came to visit Kumana sanctuary. Then there was a shortage for two seats, one jeep was sent back and two more cabs were brought. Then there was extra seat. By taking number of seats in a jeep as x and the number of seats in a cab as y and construct a pair of simultaneous equations and solve it. Thus find the number of jeeps and cabs required to carry exactly 52 people.

(b) If $x + \frac{1}{x} = a$, express the value of $x^2 + \frac{1}{x^2}$ in terms of a

4. The perimeter of a rectangular mat is 22 m and its length is x m

i. Write its breadth in terms of x

ii. If its area is 19 m^2 , show that it satisfies $x^2 - 11x - 19 = 0$

iii. Take $\sqrt{5} = 2.24$ and solve the above quadratic equation to show that the length of the mat exceeds four times its breadth.

5. When observing from a point A on a straight road lying in the North – South direction, the bearing of stone inscription P is 040° . After travelling 50m from A to the direction of north and come to B, the bearing of stone inscription P is 130° .

- Draw the rough sketch of the locations A, B and P. Write the measurements.
- Find the magnitude of $\hat{APB}$.
- Find the distance AP using trigonometric tables.
- If another inscription Q is located at a distance of 20m from P in the direction of BP. Find the magnitude of $\hat{AQP}$.

6. The following table shows the information about the time taken by a dentist to examine a patient in a dental clinic.

Time (minutes)	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Number of patients	2	6	9	15	10	7	1

- What is the modal class?
- Using the mid value of the modal class as the assumed mean, find the mean time taken by the doctor to examine a patient.

If six equally efficient dentists at the dental clinic examine patients from 8.00 am to 2.00 pm daily, (Assume that the dental clinic is held daily) show that the number of patients that can be examined at the clinic exceeds 3 500 during a month.

PART B

❖ Answer five questions only.

7. In a marathon race, cash prizes were awarded for the first place to 20th place. Prizes were awarded as Rs. 15 000 for the first place Rs. 14 500 for the second place and Rs. 14 000 for the third place. An amount of Rs. 2 000 was awarded to every runner who finished the race after 20th place.

- i. Find the cash prize for the 12th place
- ii. Which position will be awarded the cash prize of RS. 5 500?
- iii. How much it will cost to award cash prizes for the first 20 places?
- iv. If the amount spent by organizing committee on awarding the prizes for the marathon race is Rs. 241 000, find the number of runners who completed the marathon.

8. Use only a straight edge with cm / mm scale and a pair of compass and show the construction lines clearly.

- i. Construct the isosceles triangle ABC such that $AB = BC = 6\text{cm}$, $\angle B = 120^\circ$
- ii. Draw the circle passing through B and C and the centre on AC. Name the intersection point of the circle and the AC as D
- iii. Find the point E such that CE is parallel to BA and $\angle DEC = 90^\circ$

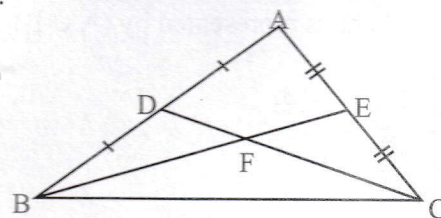
9. (a) A cuboid shaped container of side length 7 cm is completely filled when water poured 12 times from a hemispherical vessel of diameter a cm. Show that $a = \frac{7}{\sqrt[3]{\pi}}$

- (b) Find the value of $\frac{\sqrt{43.2} \times 0.85}{2.084}$ to the nearest first decimal place,

10. In ABC triangle, D and E are the mid points of AB and AC.

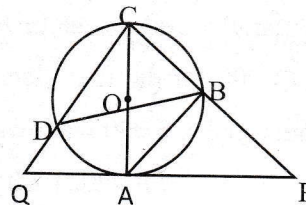
CD and BE are intersected at P.

- i. A straight line drawn parallel to DC through A meets produced line BE at G. Copy the given figure and mark the information given.
- ii. Show that $\triangle CEF \cong \triangle AEG$
- iii. Show that $2 DF = CF$
- iv. Show that $EF = \frac{1}{4} BG$



11. A, B, C, D are points on the circle with centre O. AC is a diameter, The tangent drawn to the circle at A meet the CB produced and CD produced at P and Q respectively.

- Show that BPQD is a cyclic quadrilateral
- Show that $AB^2 = BC \cdot BP$
(using equi angular triangles or any other method)



12. The following Venn diagram provides information about the players of sports meet in a school.

$\varepsilon = \{ \text{players of the sports meet} \}$

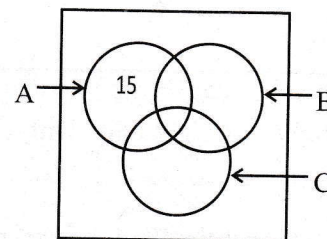
$A = \{ \text{players of track events} \}$

$B = \{ \text{players of field events} \}$

$C = \{ \text{players of team matches} \}$

$$n(\varepsilon) = 100 \quad n(A) = 50 \quad n(B) = 40 \quad n(C) = 60$$

$$n(A \cap B \cap C) = 15, \quad n(A \cap B) = 23$$



- Copy the Venn diagram and include the given information.
- How many students are participated for track and field events?
- $n(A \cup B \cup C)' = 7$ and $\frac{1}{4}$ of the players who participated for track events did not participate for any other events, complete the Venn diagram.
- How many students participated for field events or team matches?
- Who is represented by $(A \cup B)' \cap C$?





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