PABSON
SEE PRE BOARD EXAM-2078

Subject.: Compulsory Mathematics (PC 109)

Time: 3: 00 hrs **F.M.:** 100

Candidates are required to write their answers according to the instructions given.
Attempt all questions

Group"A" $[3 \times (1+1) = 6]$

1. (a) The present population of a town is P. If the population increases by $R\%$ every year, what will be the population of the town after T years? Write it.

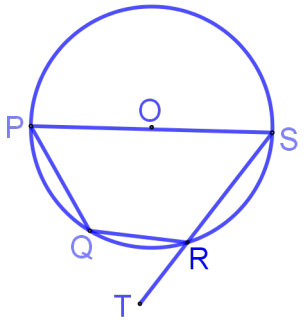
   (b) The base of an isosceles triangle is b cm and equal sides are a cm. What is the area of the triangle? Write it.

2. (a) Write the order of surd in $\sqrt[m]{a}$.

   (b) In a continuous series, if total number of terms $(N) = 20$ and $\Sigma fm = 400$, find the mean.

3. (a) What is the relation between the area of triangles RAM and NAM standing on same base AM and between the same parallel lines AM and RN?

   (b) In the given circle, O is the centre of circle. Which angle is equal to $\measuredangle QRT$? Write it.



Group "B" $[17 \times 2 = 34]$

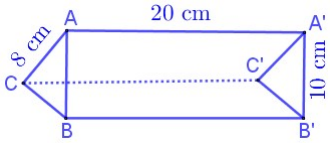
4. (a) If NC 200 = 2.45 Australian dollar and 8816 Australian dollar = 8152 Canadian dollar, how much Canadian dollar can be exchanged with NC. 45000 ?

   (b) The value of a motorcycle last year was Rs.2,38,000 and its value next year will be Rs. 1,92,780 at the certain depreciation rate. Find the rate of depreciation?

5. (a) The area of an equilateral triangular plot of land is $25\sqrt{3}\ m^2$. If the land has to enclose by a galvanized wire 5 times, how long wire is required?

   (b) The total surface area of a hemisphere is 243π cm^2. Find its volume.

   (c) In the given figure, $A'B' = 10\ cm, AA' = 20\ cm, AC = 8\ cm$ and the area of rectangular surfaces of prism is 480 square cm, find the length of BC.



6. (a) Find the HCF of : $x^3y - xy^3$ and $x^2 + 2xy + y^2$

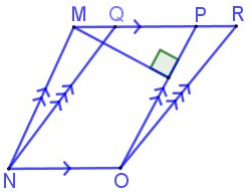
   (b) Solve: $\sqrt{x-2} = \sqrt[3]{125}$

7. (a) Find the LCM of : $\dfrac{3 \times 4^x + 4^{x-1}}{13 \times 4^x}$

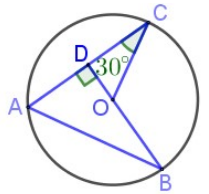
   (b) Simplify: $\dfrac{m^2+mn+n^2}{m+n} + \dfrac{m^2-mn+n^2}{m-n}$

   (c) Simplify: $\dfrac{1}{x-y} - \dfrac{1}{x+y} + \dfrac{2x}{x^2-y^2}$

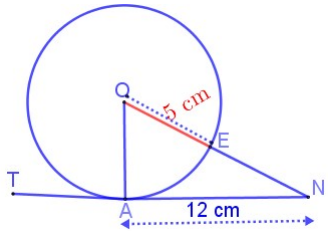
8. (a) In the given figure, $ON//RM, NM//OP, NQ//OR$ and $MS \perp OP$. If $MN = 12$ cm and area of the quadrilateral $NORQ = 84$sq.cm, find the length of MS.



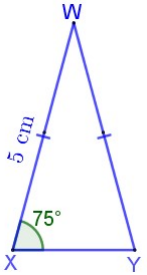
   (b) Find the value of $\measuredangle BAC$ from the given adjoining figure, where O is the centre of circle.



   (c) In the given figure, O is the centre of a circle, TN is a tangent, AN = 12 cm and OE = 5 cm. Find the length of NE.



9. (a) If WX = WY in ΔWXY, find the area of ΔWXY.



(b) The median class of a continuous data is (24 - 32), its corresponding frequency is 18 and the sum of frequencies of the data is 80. If the total frequency of the preceding terms of (24-32) is 32, find the median of the data.

10. (a) Find the probability of getting a faced card or an ace card from a well shuffled deck of 52 cards when a card is drawn at random.

(b) From a bag containing 10 red and 8 black balls of the same shape and size, two balls are taken randomly in succession without replacement. Show the probabilities of all outcomes in a tree diagram.

Group "C" $[10 \times 4 = 40]$

11. In a group of 50 students. 17 like only Mathematics and 15 like only Science. If the number of students who like none of them is half of the number of students who like both subjects, find the number of students who like at most one subject by using a venn-dagram.

12. A tourist bought a Nepali cap with 20% discount and 13% value added tax. When returning to his country, the VAT amount Rs. 83.20 was given back to him at the airport. What was the marked price of the cap? Find it.

13. Volume of a square-based pyramid is 128 cm^3. If the vertical height and the length of a side of its base are in the ratio of 3 : 4, find the total surface area of the pyramid.

14. Find the LCF of:

$$x^4 - x,\ 4x^2 - 4 \text{ and } x^3 + 2x - 2x^2 - 1$$

15. 1000 masks were distributed equally among a certain number of people. If there were 5 people more, each would have received 10 masks less. Among how many people was the mask distributed? Find it.

16. Prove that the area of triangle RAM is half of the area of parallelogram NORA standing on the same base RA and between the same parallel lines RA and MN.

17. Construct a quadrilateral PQRS in which PQ = 5 cm, QR = 5.6 cm, RS = 5.4 cm, SP = 6.8 cm and $\angle$ PQR = 75°. Then construct a triangle PSM equal in area to the quadrilateral PQRS.

18. Explore experimentally the relationship between opposite angles of a cyclic quadrilateral ROSE. (Two circles having radii at least 3 cm are necessary.)

19. The angle of depression of the top of a tree as observed from the roof of a house 30 ft high is found to be 30°. If the distance between the house and tree is $10\sqrt{3}$ ft, find the height of the tree.

20. Find the first quartile (Q_1) from the given data,

Class interval	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	2	8	15	14	10	11

Group "D" $[4 \times 5 = 20]$

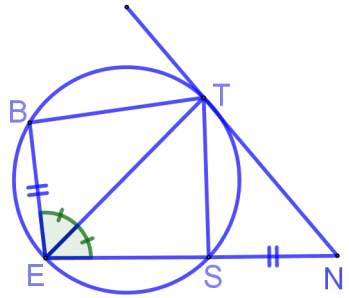
21. Sohan borrowed Rs. 24000 from Prabhu bank for 3 years at the rate of 12.5% p.a. in simple interest. He lent the money to Rohan in compound interest at the same rate, how much profit will he have after 3 years? Find it.

22. A circus tent is cylindrical in shape up to the height 12.5m and conical above it, in which the diameter of the tent is 16 m and height of the conical part is 15 m. If the tent is prepared with cloth at the rate of Rs. 120 per meter square, what is the total cost to prepare the tent?

23. If $a + b + c = d$, prove that:

$$\frac{x^{2a}}{x^{2a} + x^{d-b} + x^{d-c}} + \frac{x^{2b}}{x^{2b} + x^{d-c} + x^{d-a}} + \frac{x^{2c}}{x^{2c} + x^{d-a} + x^{d-b}} = 1$$

24. In the given figure, BEST is a cyclic quadrilateral. ES is produced so that BE = SN. If ET is the bisector of $\angle$BES, prove that NET is an isosceles triangle.



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