SEE NEW MODEL QUESTION 2074
ISSUED BY OCE (SET 3)

Subject: Mahtematics **F.M.:** 100
Time: 3 hours **P.M.:** 40

Group "A" [6 × 1 = 6]

1. (a) If the initial price of an article is Rs. P and annual rate of depreciation is R%, then write the formula to find the price after T years.

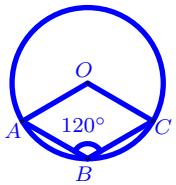
   (b) The base of an isosceles triangle is b cm and equal sides are a cm. What is the area of the triangle?

2. (a) Define LCM.

   (b) If the lower limit of the median class of any data is L, frequency of that class is f, class interval i, sum of the frequencies N and the cumulative frequency of pre-median class is cf then write the formula for finding the median (Md).

3. (a) Write the relationship between the areas of a rectangle and a triangle standing on the same base and between the same parallel lines.

   (b) In the given figure, O is the centre of the circle. If $\angle ABC = 120°$, what is the size of the reflex $\angle AOC$? Write it.



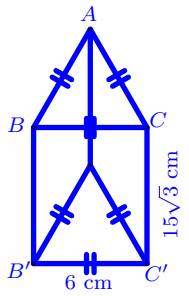
Group "B" [17 × 2 = 34]

4. (a) According to the money exchange rate of Nepal Rastra Bank, the purchasing and selling rates of 1 American dollar are NRs.103.72 and NRs. 104.32 respectively, then
   i. How many American dollars can be exchanged with NRs. 57,376?
   ii. How much Nepali rupees can you exchange with $500? Find it.

   (b) In the beginning of 2072 B.S., the population of a town was 50,000. If the annual population growth rate is 10%, what will be the population of the town at the end of 2074 B.S.? Find it.

5. (a) Find the area of a triangle with sides 3 cm, 4 cm and 5 cm.

   (b) In the given equilateral triangular prism, $B'C' = 6cm$ and $CC' = 15\sqrt{3}cm$. Find the volume of the prism.



   (c) If the volume of a sphere is 4851 cubic cm, find its diameter.

6. (a) Find the HCF of x^4–x and $x^2 + x + 1$.

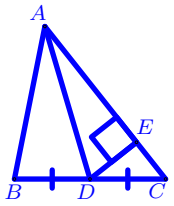
   (b) Simplify: $\sqrt[3]{16} + \sqrt[3]{54} - \sqrt[3]{250}$

7. (a) Whether the equation $\sqrt{2x-1} - 1$ has a unique solution or not? Check it.

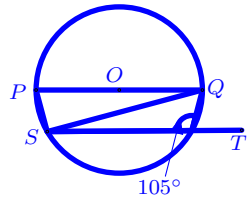
   (b) Simplify: $\dfrac{1}{1-x^{b-a}} + \dfrac{1}{1-x^{a-b}}$

   (c) If the sum of three consecutive even numbers is 36, find the numbers.

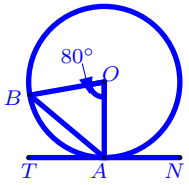
8. (a) In the figure D is the midpoint of $BC$and $DE \perp AC$. If $AC = 12$ cm and $DE = 5$ cm, find the area of ΔABC.



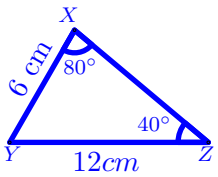
   (b) In the given diagram, O is the centre of the circle. If $\angle QRS = 105°$, what is the value of $\angle PQS$? Find it.



   (c) In the given figure O is the centre of the circle, TN is the tangent and A is the point of contact. If $\angle AOB = 80°$, find the measurement of $\angle BAT$.



9. (a) In $\Delta XYZ, \angle X = 80°, \angle Z = 40°$, XY = 6 cm and YZ = 12 cm. Find the area of ΔXYZ.



(b) In a continuous series, if the mean ($\bar{X}$) = 6, $\Sigma fm = 72 + 8k$ and $\Sigma f = 16 + k$, find the total number of terms.

10. (a) Find the probability of getting a prime number on the dice and head on the coin when a dice is rolled and a coin is tossed simultaneously.

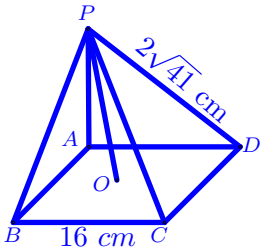
(b) Two cards are drawn randomly in succession without replacement from a well shuffled pack of 52 cards. By drawing a tree diagram show the probabilities of all the possible outcomes of getting and not getting a faced card.

. **Group "C"** [10 × 4 = 40]

11. In a group of 50 students 20 like only Maths and 15 like only Science. If the number of students who do not like any of the two subjects is double of the number of students who like both subjects, find the number of students who like at most one subject by using a Venn-diagram.

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.

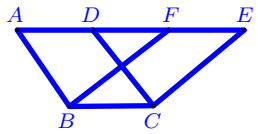
13. The given figure is of a solid square based pyramid. If the length of side of the base (BC) is 16 cm and the length of the lateral edge (PD) is $2\sqrt{41}$ cm, find the volume of the pyramid.



14. Simplify: $\dfrac{x+2}{x^2+2x+4} + \dfrac{x-2}{x^2-2x+4} + \dfrac{16}{x^4+4x^2+16}$

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

16. In the given figure, $AE//BC, AB//DC$ and $BF//CE$, then prove that: (i) $\Delta ABF \cong \Delta DCE$ (ii) $parm.ABCD = parm.FBCE$



17. Construct an isosceles triangle ABC having base BC = 6 cm and the altitude AD = 4 cm. Also construct a parallelogram CDEF equal in area to ΔABC and having one angle CDE = 45°.

18. Verify experimentally that the angles in the same segment of a circle are equal. (Two circles having radii at least 3cm are necessary.)

19. From the roof of a house the angle of depression of the top of a tree 20 ft. high was found to be 30°. If the distance between the house and the tree is 10 3 ft, find the height of the house.

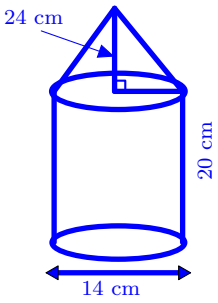
20. The first quartile of the given data is 35, find the value of x.

Marks obtained	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100
No. of Students	2	x	8	5	1

. **Group "D"** [4 × 5 = 20]

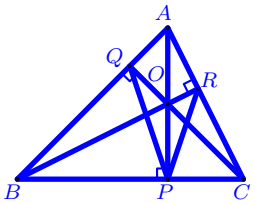
21. A sum of money is placed at simple interest for 3 years at 10% per annum and then the amount is invested for 2 years at the same rate at compound interest. If the total amount of 5 years became Rs. 471,900, what was the sum? Find it.

22. The given figure is of a solid object made up of a cone and a cylinder. If the heights of the cylinder and cone are 20 cm and 24 cm respectively and the diameter of the base is 14 cm, find the total surface area of the object.



23. If $x^2 - 2 = 2^{\frac{2}{3}} + 2^{\frac{-2}{3}}$, then prove that:
(i) $x = 2^{\frac{1}{3}} + 2^{\frac{-1}{3}}$ (ii) $2x^3 - 6x = 5$

24. In the given figure, $AP \perp BC, BR \perp AC$ and $CQ \perp AB$. Prove that: $\angle OPQ = \angle OPR$.

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