SEE NEW MODEL QUESTION 2074
ISSUED BY OCE (SET 2)

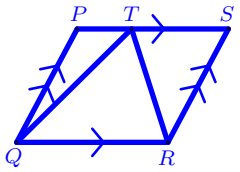
Subject: Mahtematics **F.M.:** 100
Time: 3 hours **P.M.:** 40

Group "A" [6 × 1 = 6]

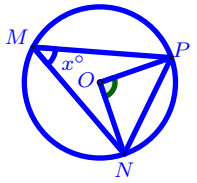
1. (a) Write down the definition of Value Added Tax (VAT).
   (b) If three sides of a triangle are a, b and c respectively, what is the semi perimeter of the triangle? Write it.

2. (a) Simplify: $x^{a-b} \times x^{b-a}$
   (b) Write the formula to find the value of lower quartile (Q_1) of a continuous data.

3. (a) In the given figure, what is the relation between the area of the parallelogram $PQRS$ and the ΔQTR? Write it



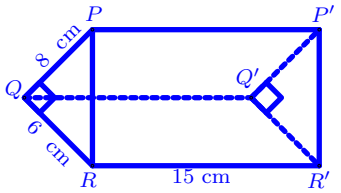
   (b) In the adjoining figure, O is the center of a circle. If $\angle NMP = x°$, find the value of $\angle NOP$.



Group "B" [17 × 2 = 34]

4. (a) The price of an object with 13% value added tax is Rs. 5763. What will be the value added tax amount? Find it.
   (b) The present price of a motorcycle is Rs. 2,25,000. If its price is depreciated per year by 8%, after how many years will the price of the motorcycle be Rs. 1,75,204.80? Find it.

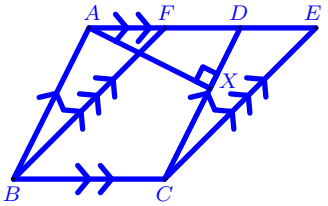
5. (a) The area of an isosceles triangular land whose base side length 10 meter is 60 square meter. Find the measure of its remaining sides.
   (b) The volume of a cylinder with diameter of its base 14 cm is 2156 cm^3. Find the height of the cylinder.
   (c) In the given solid triangular prism, if PQ⊥QR, PQ = 8 cm, QR = 6 cm and RR′ = 15 cm, find the lateral surface area of the prism.



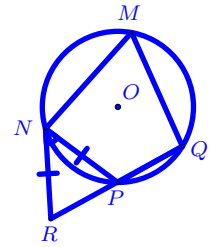
6. (a) Simplify: $2\sqrt{98} - 8\sqrt{32} + 3\sqrt{72}$
   (b) Solve: $9 - \sqrt{x-4} = 5$

7. (a) Evaluate: $\dfrac{3 \times 4^x + 4^{x-1}}{13 \times 4^x}$
   (b) If 5 is added to the square of a positive number, the sum is 69. Find the number.
   (c) Simplify: $\dfrac{1}{x-y} - \dfrac{1}{x+y} + \dfrac{2x}{x^2-y^2}$

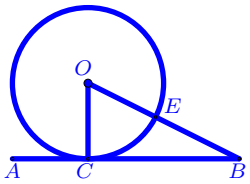
8. (a) In the given figure, BC∥AE, BA∥CD, BF∥CE and AX⊥CD. If AB= 12 cm and area of the quadrilateral BCEF = 84 sq. cm., find the length of AX



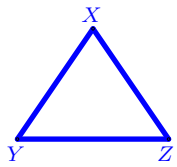
   (b) In the given figure, O is the centre of the circle and MNPQ is a cyclic quadrilateral. If NR = NP and ∠PNR = 50°, find the size of ∠NMQ



   (c) In the given figure, O is the center of the circle and AB is a tangent line. If OC = 5 cm and BC = 12 cm, find the measure of BE.



9. (a) In the given triangle XYZ, XY = 8 cm, YZ = 12 cm and area of ΔXYZ is 24 sq. cm. Find the size of $\angle$XYZ.



(b) In a grouped data, if the number of terms $(N) = 9b + 5$, Σfm= 350 and Mean $(\overline{X}) = 7$, find the value of N.

10. (a) Find the probability of getting a number divisible by 3 or a square number when a fair dice is thrown.

(b) From a bag containing 10 red and 6 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 survey of a group of 180 students, 50 students say to like cricket game only, 30 students say to like basketball game only and 50 students say do not like both games.

xli Represent the above information in a Venn diagram.

xlii Find the ratio of the students who like cricket game and basketball game.

12. Manish bought some American dollar for Rs. 2,00,000. But after four days, the Nepalese currency was devaluated in the comparison of American dollar by 5%. Again Manish exchanged the Nepali currency by giving American dollar in the day of devaluation of Nepalese currency. How much does he gain or loss? Find it. (\$1 = NRs.104.28)

13. Find the total surface area of a square based pyramid having the slant height 10 cm and vertical height 8 cm.

14. Find the LCM of:
$a^3 + 1 + 2a^2 + 2a, a^3$–1 and $a^4 + a^2 + 1$

15. Simplify:
$$\frac{x}{(x-y)(x-z)} + \frac{y}{(y-z)(y-x)} + \frac{z}{(z-x)(z-y)}$$

16. A triangle PMN and a parallelogram RMNQ are constructed on the same base MN and between the same parallel lines MN and PQ.

Prove that: area of ΔPMN $= \frac{1}{2}$ area of parm.RMNQ.

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 relation between the central angle APC and the circumference angle ABC standing on the same arc AC of a circle ABC. (Two circles of radii not less than 3 cm are necessary.)

19. A 1.5 meter tall person is standing in front of 41.5 meters high tree. When observing the top of the tree an angle of 45° is formed with the eyes. Find the distance between the tree and the person.

20. If the median of the following given data is 19, find the value of P.

Age in year	6-12	12-18	18-24	24-30	30-36	36-42
No. of students	4	10	P	4	3	3

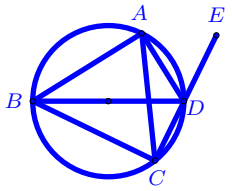
. **Group "D"** $[4 \times 5 = 20]$

21. A bank has fixed the rate of interest 10% per annum semiannually compound interest in account A and 12% per annum annually compound interest in account B. If you are going to deposit Rs. 25,000 for 2 years in the same bank, in which account will you deposit and why? Give your reason with calculation.

22. A person bought a water tank of circular base having the radius 1.05 meter and height 3.5 meter for the use of own house from the shop. If the upper part of the tank is semi spherical, how many liters of water will be contained in the tank? Find it.

23. Three years ago, the sum of the ages of the father and son was 48 years. After three years the ratio of the ages of the father and son will be 3: 1, then how much old is the father than his son? Find it.

24. In the given figure, ABCD is a cyclic quadrilateral. The side CD is produced to E. If AD bisects $\angle$BDE, prove that ΔABC is an isosceles triangle.

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