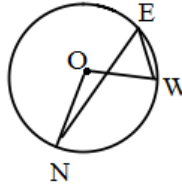


Attempt all the questions.

**Group-A** [3 × (1+1) = 6]

1. (a) The population of a city increases every year by G%. If the present population of the place is H, what will be the population of the place at the end of K years?
- (b) Write down the formula to find the volume of cylindrical object in which the radius of base is x cm and length is y cm.
2. (a) Which value of x satisfies the equation  $10^x = 1$ ?
- (b) Write down the formula to find the median of a continuous series.
3. (a) What is the relation between the areas of parallelogram and a rectangle standing on the same base and between the same parallel lines? Write it.
- (b) In the given figure, O is the centre of circle. Write down the relationship between  $\angle NOW$  and  $\angle NEW$ .



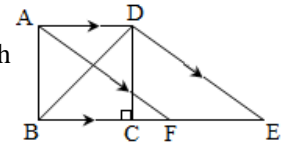
**Group-B** [4 × (2+2) + 3 × (2+2+2) = 34]

4. (a) After devaluation of Nepali currency in comparison with American dollar by 5%, if NRs 480480 can be exchanged with 4400\$. Find the exchange rate of dollar before the devaluation of Nepali rupees.
- (b) Ravi bought a motorcycle for Rs 2,50,000 in the beginning of B.S. 2075 and sold it for Rs 2,02,500 at the end of B.S. 2076. Find the rate of compound depreciation.
5. (a) Calculate the volume of a spherical shot-put whose radius is 3.5 cm.
- (b) The perimeter and area of triangular base of a 10 cm long prism are 24 cm and  $24 \text{ cm}^2$ , find its lateral surface area and total surface area.
- (c) How much colourful paper is required to make a birthday hat as shown in the figure having height 24 cm and diameter of base 14 cm? Find it.

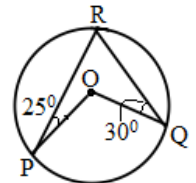


6. (a) Simplify:  $\frac{a^2 + ab + b^2}{a + b} + \frac{a^2 - ab + b^2}{a - b}$
- (b) Simplify:  $\frac{1}{(x - y)(x - z)} + \frac{1}{(y - z)(y - x)}$
7. (a) Solve:  $5^x + 15 \times 5^{x-1} = 100$
- (b) Simplify:  $\frac{\sqrt{45a^2} - \sqrt{80a^2} + 6a\sqrt{5}}{5\sqrt{5a^2}}$
- (c) Solve:  $\sqrt{x+11} = 11 - \sqrt{x}$

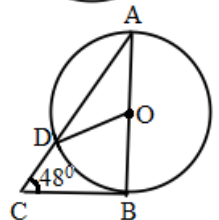
8. (a) In the given figure, ABCD is a square in which  $BD = 6 \text{ cm}$ . Find the area of  $\square ADEF$ .



- (b) In the given figure, O is the centre of the circle,  $\angle OPR = 25^\circ$  and  $\angle OQR = 30^\circ$ , find the measure of  $\angle PRQ$  and  $\angle POQ$ .



- (c) In the given figure, O is centre of circle, BC is a tangent. If  $\angle ACB = 48^\circ$ , find the value of  $\angle BAC$  and  $\angle BOD$ .



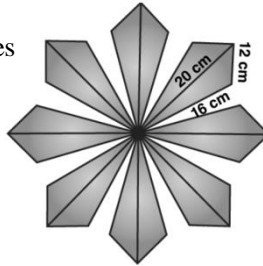
9. (a) In a  $\Delta ABC$ , if  $\angle ABC = 37^\circ$ ,  $\angle BAC = 98^\circ$ ,  $BC = 9 \text{ cm}$  and  $AC = 6\sqrt{2} \text{ cm}$ , find its area.
- (b) In a continuous data, if the mean ( $\bar{X}$ ) = 35,  $\sum fx = 660 + 4p$  and the number of terms (N) = p + 10, then find the value of p and N.
10. (a) What is the probability of getting a card having cube number or a prime number when a card is drawn randomly from a number cards numbered from 2 to 32? Find it.
- (b) Two children are born in the interval of 5 years from a married couple. Find the probability of having both sons by drawing a tree diagram.

**Group-C (10 × 4 = 40)**

10. A survey regarding the use of social networking services was conducted in a group of 75 youths and found that 28 youths use TikTok only and 17 youths use Instagram only. If the number of youths who use both TikTok and Instagram is twice the number of youths who use none of these services, find the number of youths who use TikTok by drawing a Venn-diagram.

11. The marked price of a table is Rs. 4000. If 20% discount is given and some percentage of VAT is imposed. Then, the price of table becomes Rs. 3616. How much rate of VAT is levied on it? Calculate it.

12. A floral design on a floor is made up of 16 identical tiles which are triangular in shape. The side lengths of each triangle are 20 cm, 12 cm and 16 cm respectively. Find the cost of polishing the tiles at Rs 1.50 per sq. cm.



13. Simplify:  $\sqrt{\frac{x^{a^2}}{x^{b^2}}} \times \sqrt{\frac{x^{b^2}}{x^{c^2}}} \times \sqrt{\frac{x^{c^2}}{x^{a^2}}}$

14. Find the H.C.F. of  $x^4 + x^2 + 169$ ,  $x^3 + x(x + 13) + 4x^2$  and  $3x(x + 5) + 39$

15. Prove that the area of a triangle is one half of the area of a parallelogram standing on the same base and between the same parallels.

16. Construct a parallelogram PQRS in which PQ = 5 cm, diagonal PR = 6 cm and diagonal QS = 8 cm. Also, construct a triangle PSA whose area is equal to the area of the parallelogram.

17. Explore experimentally the relationship between the opposite angles of a cyclic quadrilateral. (Two circles of radii at least 3 cm are required).

18. In a windy season, a straight pine tree of height 27m is broken by a storm such that the top of the tree touches the ground surface making an angle of  $30^\circ$ . Find the height of the broken part of the tree and remaining part.

19. The following table shows the speed of vehicles that observed in the road of a village. Calculate the upper quartile.

Speed (in km/hr)	0-15	15-30	30-45	45-60	60-75
No. of vehicles	8	6	12	15	7

**Group-D (4 × 5 = 20)**

20. Mr. Chaudhary deposited a sum of money at simple interest in his account at a bank for 5 years at 10% per annum. But after 3 years, the bank slightly changed its policy and decided to pay annual compound interest at the same rate. If he received the total amount of Rs 4,40,440 in 5 years, how much sum was deposited? By what percentage the simple interest of first 3 years is more than the compound interest of last 2 years? Find it.

21. Ashok has fixed an overhead water tank in the shape of cylinder surmounted by a hemisphere on the roof of his house. The overhead water tank has its internal radius 90 cm and total height 3.8 m. This tank is filled by pumping water from a sump (an underground water tank) which is completely filled with 10,000 litres of water.

- (i) How many litre of water is left in the sump after the overhead tank has been completely filled with water?
- (ii) In how many days will the water of overhead water tank last if his family consumes 495 litres of water in a day? Find it.

22. Namrata went to the market and saw the price list in the fruits corner as mentioned below in the table.

Types of fruits	Price list per kg
Oranges	Rs 40
Apples	Rs 105
Guavas	Rs 55
Pomegranates	Rs 125
Grapes	Rs 80

She decided to buy 5 kg fruits in which there were apples and grapes. Then, she gave a 500 rupees note and the shopkeeper returned Rs 25. How much apples and grapes did she buy from the fruits corner? Find out.

23. In parallelogram ABCD; A is joined to any point E on BC, AE and DC produced meet at F. Prove that:

- (i) Area of  $\triangle AED$  = Area of  $\triangle ABF$
- (ii) Area of  $\triangle BEF$  = Area of  $\triangle CDE$

**THE END**