SOS HERMANN GMEINER SCHOOLS NEPAL
Joint SEE Preparatory Examination-2078

Subject: Compulsory Mathematics

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

Attempt all the questions. All the working must be shown.

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

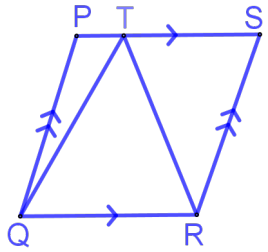
1. (a) If a, b and c represent the compound Interest. Principal and Amount respectively, write the relation between a, b and c

   (b) What is the volume of hemisphere whose radius is x cm?

2. (a) If the factors of two expressions are different to each other, what is the L.C.M. between the two expressions?

   (b) What is called the position that divides the continuous data below 75%?

3. (a) In the figure alongside, what is the relation between the area of the parallelogram PQRS and the triangle QTR ?



   (b) What is the relation between the opposite angles of a cyclic quadrilateral?

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

4. (a) Find the price of an article costing Rs.2000 after levying 13% Value Added Tax.

   (b) The value of a machine is depreciated from RS.3200 to Rs.3040 in a year. Find the rate of depreciation in percent.

5. (a) The sides of a triangular field are in the ratio of 5:6:7. If its perimeter is 1800, what is the area of the field?

   (b) Three iron spheres having radii 1 cm, 6cm and 8cm are melted to form a new sphere. Find the radius of the new sphere.

   (c) If the height of a cone is three times the radius of its base and its volume is 512π cubic cm, find the radius of base of the cone.

6. (a) Find the L.C.M. of :

$$x^3y - xy^3, (x^2 - xy)^2$$

   (b) Simplify:

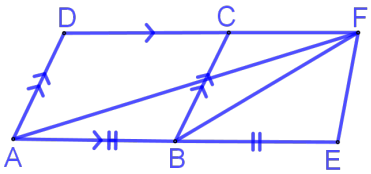
$$\frac{1}{(x-2)(x-3)} + \frac{1}{(x-2)(x-1)} - \frac{2}{(x-3)(x-1)}$$

7. (a) If 4 is subtracted from the square of a number the result is 21. Find the number

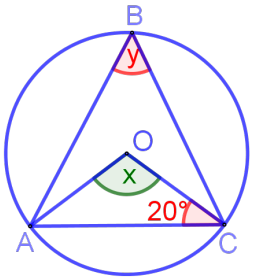
   (b) Simplify: $\frac{1}{1-p+p^2} + \frac{1}{1+p+p^2} - \frac{1}{1-p^2+p^4}$

   (c) If $a^p a^q = (a^p)^q$, prove that: $p(q-2) + q(p-2) = 0$

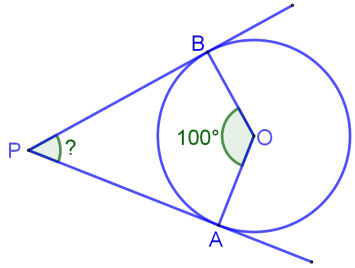
8. (a) In the figure alongside, AE // DF and B is midpoint of AE. If the area of ΔAEF is 20 sq. cm, what is the area of parallelogram ABCD?



   (b) In the figure alongside, find the size of unknown angles where O is its center and $\angle$ ACO= 20°



   (c) In the given figure, O is the center of circle. PA and PB are two tangents. If $\angle$ AOB = 100°, find the value of $\angle$ APB.



9. (a) In A ΔABC, AB = 8cm and BC = 12cm. If the area of ΔABC is $24\sqrt{2}$ sq.cm., find the value of $\angle$ ABC.

   (b) In a continuous series, the average weight of some students is 45kg and the sum of their weight is 540 kg. Find the number of students.

10. (a) If Two dice are rolled together, find the probability of getting 3 appearing first and even numbers appearing in second time

    (b) Two cards are drawn randomly one after another without replacement from a well shuffled pack of 52 cards. By drawing a tree diagram show that the probability of all the possible outcomes of getting or not getting face a card

Group "C" [10 × 4 = 40]

11. In a survey of a group of a people, it was found that 70% of people liked folk songs. 60% liked modern songs and 400 liked both of them If 10% liked none of them.
    (a) Represent the above information in Venn diagram.
    (b) Find the number of people in the survey.
    (c) Find the number of people who liked flock song only.

12. A merchant purchased 500 pieces of Dhaka Topi from Palpa at the rate of Rs.2500 per piece. He exported them to the USA with 5% export tax. If he sold them at $40 per piece in the USA, calculate his loss or profit percentage. [Use$1 = NPR 115]

13. The perimeter of a right-angled triangle is 12cm and its area is 6cm^2. Find the sides of the triangle.

14. Simplify:
$$\frac{7\sqrt{3}}{\sqrt{10}+\sqrt{3}} - \frac{2\sqrt{5}}{\sqrt{6}+\sqrt{5}} - \frac{3\sqrt{2}}{\sqrt{15}+3\sqrt{2}}$$

15. A two digit number is 4 times the sum of its digits. The sum of the number formed by reversing its digits and 9 is equal to 2 times the original number. Find the number.

16. Construct a quadrilateral ABCD in which AB = 3.6 cm, BC = 7.7cm, CD= 6.8 cm, DA = 5.1 cm and AC = 8.5 cm. Also construct a triangle equal in area to the quadrilateral.

17. Prove that the area of a triangle is half of the area of a parallelogram standing on the same base and between the same two parallel lines.

18. Verify experimentally that the angle AKB at the center of circle is double than angle ACB at circumference standing on the same arc AB. [Two circles of radii 3cm are necessary.]

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

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

Class interval	0-20	20-40	40-60	60-80	80-100
Frequency	2	x	8	5	1

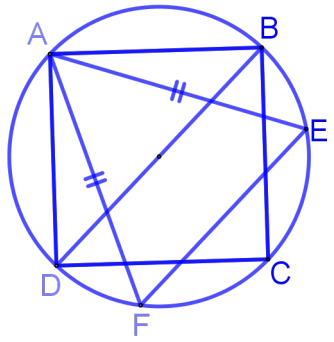
Group "D" [4 × 5 = 20]

21. A men borrows Rs 40,000 for 2 years at 10% par annum compound interest compound annually. He paid only half of the principal at the end of two years. He paid the remaining principle and interest at the same rate at the end of next two years. How much amount did he pay at last to clear the dept ?

22. A cylindrical tank having 1.40 m inner diameter and 1.5 m height is constructed in a school to collect sky water. If the upper part of the tank is a cone having height 0.36 m, how much water can be held in the tank ?

23. Simplify:
$$\frac{m+(m^2n)^{\frac{1}{3}}+(mn^2)^{\frac{1}{3}}}{m-n} \times \left(1-\frac{n^{\frac{1}{3}}}{m^{\frac{1}{3}}}\right)$$

24. In the figure alongside, ABCD is a square and AFE is a triangle, in which AF = AE both inscribed in a circle. Prove that EF//BD.



Good Luck