Joint SEE Preparatory Examination - 2078

Subject: Compulsory Mathematics

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

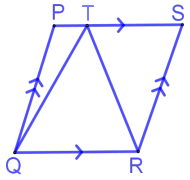
Attempt all the questions. All the working must be shown.

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

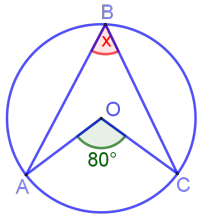
1. (a) If initial population of Pokhara is P and annual rate of population growth is R %. Then what is the population of Pokhara after X years. Write it.
   (b) The base of an isosceles triangle is y cm and equal side are x cm. What is the area of triangle write it.

2. (a) Simplify : $a^{x-y} \times a^{y-x}$
   (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 ΔTQR.Write it.



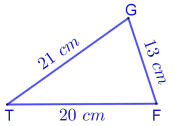
   (b) In the given figure if O is the centre of the circle then what is the value of x.



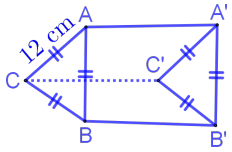
Group "B" $[17 \times 2 = 34]$

4. (a) After 12% discount, the price of an article is Rs 1320. Find its marked price.
   (b) A machine was bought for Rs. 400000 some years ago and now its value is Rs. 196000 if the value of the machine is depreciated at 30% pa. When was the machine bought?

5. (a) Find the area adjoining triangle.



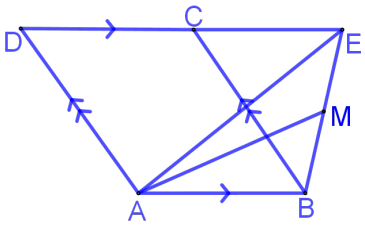
   (b) If the volume of a hemisphere is 144π cm^3 then find its radius.
   (c) In the adjoining figure, curved surface area and length of side of equilateral triangle are 1080 cm^2 and 12 cm. Find the height of triangular prism.



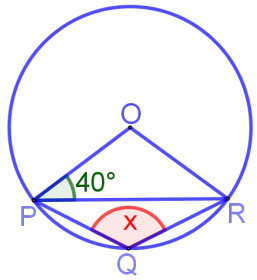
6. (a) Simplify: $\dfrac{9^x \times 3^{x-1} - 3^x}{3^{2x+1} \times 3^{x-2} - 3^x}$
   (b) Solve: $\sqrt{2x-7} = 7$

7. (a) If $x = 10^a, y = 10^b$ and $x^b.y^a = 100$, prove that $ab = 1$.
   (b) Simplify: $\dfrac{x^2+xy+y^2}{x+y} + \dfrac{x^2-xy+y^2}{x-y}$
   (c) If 15 is subtracted from the half of the square of a positive number. The result is 35. Find the number.

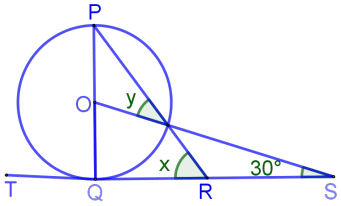
8. (a) In the given figure DE//AB, AD//BC and M is mid-point of BE. If the area ΔAME is 15 cm^2. Find area of parallelogram ABCD.



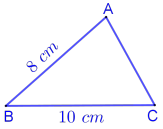
   (b) In the given figure O is the centre. If $\angle OPR = 40°$ Find the value of $\angle PQR$.



   (c) In figure O is the center of circle, TQS is tangent, Q is point of contact and $\angle OSQ = 30°$. Find the value of x and y.



9. (a) If area of ΔABC is 20 cm^2, AB = 8 cm, BC = 10 cm, find the value of $\angle$ABC.



   (b) In a continuous series the average weight of some student is 30kg and the sum of their weight is 1800kg. Then find the number of student.

10. (a) A card is drawn at random from the set of cards numbered from 1 to 30. Find the probability that the card may be a prime numbered or an even numbered card.

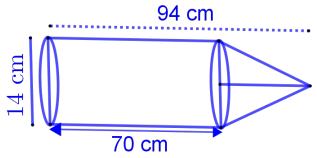
(b) A beg contain 5 red and 6 blue marble. Two marble are drawn randomly one by one (without replacement), by drawing a tree diagram show all the probabilities with possible outcomes.

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

11. In a school of of 35 teachers and the ratio of teacher, who use messenger and viber is 3:2. If 8 teacher use both and 3 teacher use non of them.
    (a) Show given information in Venn Diagram.
    (b) How many teachers use messenger?

12. After allowing 20% discount on the marked price of a motorcycle 15% VAT was levied and sold it. If the difference between the selling price with VAT and selling price after discount is Rs. 54000. Find the marked price of that motorcycle.

13. Find total surface area of solid object from given figure.



14. Find the L.C.M. of:

$$m^3 - 8n^3, 2m^2 - 5mn + 2n^2 \text{ and } 2m^2 - 8n^2$$

15. The difference of the age of two sisters is 5 years and the product of their ages is 300. Calculate the present age of two sisters.

16. A triangle PMN and a parallelogram RMNQ are constructed on the same base MN and between the same parallels MN and PQ. Proved that area of $\Delta PMN = \frac{1}{2}$ *parm. RMNQ*

17. Construct A quadrilateral $PQRS$ in which $PQ = QR = 6$ cm, $PS = 7$ cm, $\measuredangle SPQ = 45°$ and $\measuredangle PQR = 60°$, then construct a triangle equal in area to the quadrilateral $PQRS$.

18. Verify experimentally that opposite angles P and R of cyclic quadrilateral are supplementary.

19. A man 1.6 m tall is standing x m away from a pole of height 37.6 m on the same level of the ground. He observes that the angle of elevation of the top of the pole and found to be 60°. Calculate the value of x.

20. Find third quartile from following data.

Class interval	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	7	8	12	15	10

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

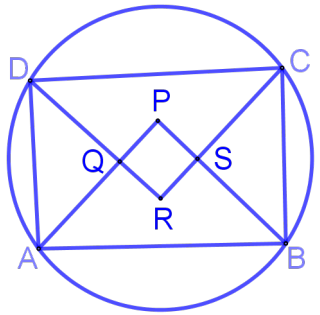
21. A water tank formed with combination of cube and square pyramid on its top. The total height of tank is 10 m and length of side of cube is 6 m. If the tank is filled with water at the rate of 10 paisa per liter. What is the total cost of water. Find it.

22. Harry borrowed Rs 2,50,000 from a Banijya Bank at 12% p.a simple interest for 3 years. Immediately he lends whole amount to Eva for same rate at compound interest yearly. If Eva lends the whole sum to Shan at same rate and same time at compound interest half yearly. What will be the profit of Harry and Eva after 3 years.

23. If $p + q + r = 0$ then prove that,

$$\frac{k}{1 + x^p + x^{-q}} + \frac{k}{1 + x^q + x^{-r}} + \frac{k}{1 + x^r + x^{-p}} = k$$

24. In the given figure, AP, BP, CR and DR are the bisector of $\measuredangle A, \measuredangle B, \measuredangle C$ and $\measuredangle D$ respectively in a cyclic quadrilateral $ABCD$. Prove that $PQRS$ is a cyclic quadrilateral.



Good Luck