

## SEE MODEL QUESTION SET

Class: 10

Subject: Com. Mathematics

Full Marks: 100

Time: 3 hour

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks.

**Attempt all the questions.**

**Group: 'A'** [61=6]

1.
  - a. Write the formula to calculate the VAT percent when selling price with VAT and selling price without VAT are given.
  - 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. If  $x^{a-b} \times x^{c+b} = x^y$ , then express  $y$  in terms of  $a$  and  $c$ .
  - b. Write the formula to calculate value of first quartile from continuous series.
3.
  - a. In the given figure, what is the relation between the area of the parallelogram PQRS and  $\Delta TQR$ . Write it.
  
  - b. In the adjoining figure, O is the centre of the circle. If  $\angle NMP = \frac{x}{2}$ , find the value of  $\angle NOP$ .

**Group: 'B'** [172=34]

4.
  - a. It is given that 1\$=NRS.105. If Nepali currency is devaluated by 10% at this rate, how many US\$ can be exchanged with NRS.1,73,250? Find it.
  - b. The population of Dhampus village was 10,000 few years ago. The present population of the village is 13,310. If the population grows at 10%, in how many years ago it was 10,000?
5.
  - a. The perimeter and the length of two sides of a triangle are 54 cm, 12 cm and 18 cm respectively. Calculate the area of the triangle.
  - b. If the total surface area of a solid sphere is  $616 \text{ cm}^2$ , what will be its radius?
  - c. Calculate the lateral surface area of the given prism.

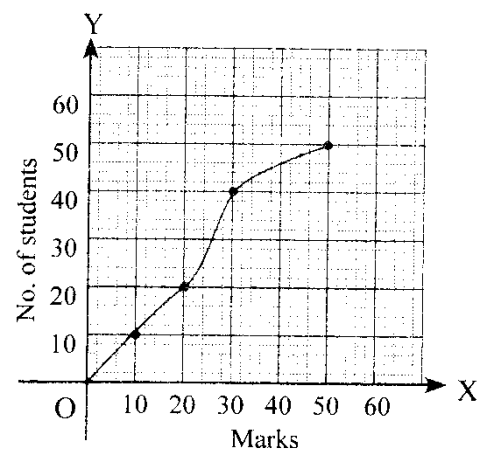
6. a. Find the HCF of  $x^4 - x$  and  $x^2 + x + 1$ .  
 b. Simplify:  $\sqrt[3]{16} + \sqrt[3]{54} - \sqrt[3]{250}$
7. a. Evaluate:  $\frac{3^{x-1} + 2 \times 3^x}{3^{x-1}}$   
 b. If the sum of a number and 25 times of its reciprocal is 10, find the number.  
 c. Simplify:  $\sqrt{x^2 - 8} = x - 2$
8. a. Calculate the area of the given quadrilateral ABCD.

b. In the given diagram, O is the centre of the circle. If BCD is a tangent with C is the point of contact and  $\angle CAF = 30^\circ$ , find  $x^\circ$  and  $y^\circ$ .

c. In the given diagram, O is the centre of the circle. If  $\angle QRS = 105^\circ$ , what is the value of  $\angle PQS$ ? Find it.

9. a. In the given figure,  $CD = 12$  cm,  $CF = 14$  cm,  $CE = 18$  cm,  $\angle ECF = \frac{1}{2} \angle DCE$  and the area of  $\triangle CDE$  is  $54$  cm<sup>2</sup>. Find the area of quadrilateral CDEF.

b. Find the median class and frequency of median class from the given cumulative frequency curve.



10. a. From a deck of number cards numbered from 3 to 32, a card drawn at randomly. Find the probability of getting this card divisible by 5 and 7.

- b. There are 8 white and 12 yellow identical balls in a bag. A ball is drawn from the bag without replacement. Then another ball is drawn. Draw a tree diagram to show all the probability and then find the probability of getting the different colour balls.

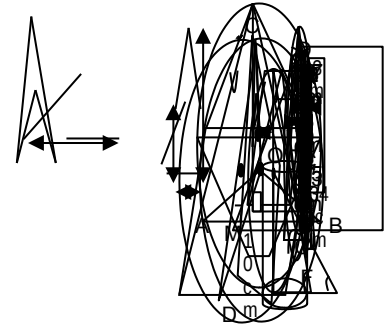
**Group: 'C'** [104=40]

11. Out of 100 students, 80 passed in Science, 71 passed in Mathematics, 10 failed in both subjects and 7 did not appear in an examination. Find the number of students who passed in both subjects by representing the above information in a Venn-diagram.
12. A shopkeeper gained Rs.3000 by selling a mobile phone allowing 10% discount. He would have gained Rs.5000 if discount was not allowed. What was the marked price of the mobile phone? Find it.
13. The adjoining figure is a square base pyramid. If its slant height is 13 cm and its total surface area 360 square cm. find the volume of the pyramid.
14. Find the HCF and LCM of  $x^4 + (2b^2 - a^2)x^2 + b^4$  and  $x^4 + 2ax^3 + a^2x^2 - b^4$ .
15. Three years ago, the sum of the ages of father and son was 48 years. After three years the ratio of the ages of the father and son will be 3:1. Find their present ages.
16. Prove that the area of  $\triangle ABE$  is half of the area of parallelogram ABCD standing on the same base AB and between the same parallel lines AB and DE.
17. Construct  $\triangle ABC$  in which  $a=5$  cm,  $b=4.8$  cm and  $c=6.8$  cm. Then, construct the parallelogram equal in area to  $\triangle ABC$  having a side of the parallelogram is 6 cm.
18. Verify experimentally that the sum of opposite angles is a cyclic quadrilateral PQRS are supplementary. (Two figures are necessary.)
19. The circumference of a circular pond is 176 m and a pillar is fixed at the centre of the pond. If a person finds the angle of elevation  $60^\circ$  on the top of the pillar from any point on the bank of the pond, find the height of the pillar above the water level.
20. If  $Q_3 = 53\frac{1}{4}$  of P from the given data:

Marks	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	5	6	7	P	10	3

**Group: 'D'** [54=20]

21. According to the system of yearly compound interest, a sum of money amounts to Rs.14520 in 2 years and in 3 years it amounts to Rs.15972. Find the sum and the rate of interest.
22. A tent is cylindrical in shape up to the height of 10 m and it is surrounded by a cone, the total height of the tent is 34 m with diameter of the base is 14 m. find the cost of preparing the tent at the rate of Rs.70 per square meter.
23. If  $a+b+c=0$ , prove that  $\frac{1}{1+x^a+x^{-b}} + \frac{1}{1+x^b+x^{-c}} + \frac{1}{1+x^c+x^{-a}} = 1$ .
24. In the adjoining figure, the chords AB and CD are intersect perpendicularly with each other at point M. Then prove that  $\angle AOD + \angle BOC = 180^\circ$ .



The End

1  
4  
c  
m