SEE MODEL QUESTION 2080

Time: 3 hrs F.M. : 75
Subject: Compulsory Maths P.M. : 27

(All the questions are compulsory.)

1. In a group of 1225 students, it was found that 630 people like maths and four out of ten parts like maths but not science. If every student likes to study at least one of them, then answer the following. [1+2+2+1]
   a) Write the set notation to represent the number of students who like at most one subject.
   b) Find the number of students who like both subjects.
   c) How many students like science but not maths?
   d) What percentage of students who like science is equal to number of students who like maths?

2. A person took a loan of Rs 375000 from a bank for two years at the rate of 15% compounded annually. If the person paid Rs 187500 at the end of first year to reduce the interest, then answer the following. [2+1+2]
   a) Find the total amount he had to pay to clear his debt.
   b) How much interest did he pay during the two years.
   c) If the person had paid the loan only at the end of second year, find how much more or less percentage of interest did he pay?

3. The population in the beginning of 2076 BS was 64000 and in the end of 2078 BS was 74088. [1+2+1]
   a) What will be the population (P) of a place after 'T' years at R% growth rate?
   b) Find population growth rate of the town.
   c) If 200 people migrated to the town at the beginning of 2078 BS, find the new population of the town at the end of 2078 BS using same rate of population growth.

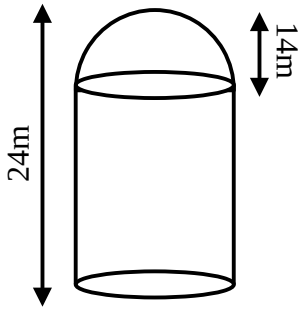
4. Mr Ram purchased some US dollars for Rs. 264000 at the given money exchange rates. [1+1+1+1]

Currency	Buying Rate	Selling Rate
$1	Rs. 131	Rs. 132

   a) How much US dollars did he buy?
   b) On the next day, Nepalese currency devaluated by 10%. Then find the new exchange rates.
   c) How much Nepalese rupees can be exchanged from the new exchange rates?
   d) If Mr Ram exchanged US dollars into Nepali currency after devaluation, how much percentage of profit or loss does he have?

5. A pillar is made up of a cube and a pyramid. If the height of the cube is 12 m and the total height of the pillar is 18 m. [1+2+2]
   a) Find the height of pyramid shape.
   b) Find the area of pillar for painting purpose.
   c) Compare Volume and LSA of the pillar.

6. A water tank is made up of a combination of a cylinder and a hemisphere. If the total height of the tank is 24 m and height of hemisphere is 14 m.



   a) Find radius of the base of water tank.
   b) Find the volume of water tank.
   c) Find the cost to fill the tank at the rate of water at Rs 10 per liter.

7. A metallic solid is made up of cone and hemisphere. If the height of hemisphere is 9cm and the height of solid is 24cm. [1+2+2]
   a) Write the formula to find the radius of base when vertical height and slant height of cone are given.
   b) Calculate the total surface area of solid.
   c) If the metallic solid was melted into cylindrical object of diameter 9cm, find the height of cylinder.

8. The product of first three terms in GS is 27 and the second term is equal to the 12^{th} term in a Arithmetic Sequence. Then [2+1+2]
   a) Find the second term in GS.
   b) Express the relation between 'a' and 'd' in the given Arithmetic Sequence.
   c) Find the sum of 23 terms which are in AS.

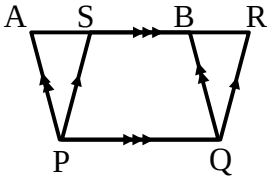
9. Product of digits of a natural number is 24 and if the number is reversed and 18 is added to it, it becomes the number itself. [1+2+1]
   a) What is the standard form of two digit number.
   b) Find the number and its reverse.
   c) By how much percent is the digit in unit place more or less than digit in tens place?

10. [2+3]
   a) Simplify :

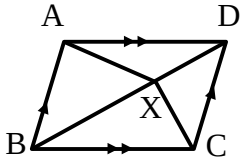
$$\frac{3}{x+1}-\frac{1}{3+x}+\frac{3}{1-x}+\frac{1}{x-3}$$

   b) $3^x(27.3^x - 244) + 3^2 = 0$

11. In the given figure, two parms ABPQ and PQRS are on same base PQ and between two parallel lines AS // PQ. [1+2+2]



   a) From which congruency fact are △APS and △BRQ congruent?
   b) Prove that area of ABPQ and PQRS are equal.
   c) In the adjoining figure, ABCD is a parallelogram and X is any point produced on the diagonal BD. Then prove that: 2 (area of △AXD) = (area of quad. AXCD)



12. ABCD is a cyclic quadrilateral in the circle. [1+2+1]
   a) Write the relation between ∠ABC and ∠ADC.
   b) Experimentally verify that sum of opposite angles of a cyclic quadrilateral is supplementary.
   c) The measure of a central angle in a circle is $(5x)^O$ and the measure of the inscribed angle is $(x + 60)^{O.}$. Find the measure of x.

13. [3 + 1]

a) Construct a quadrilateral PQRS in which PS = 3cm, RS = 4cm, PQ = 5cm, QR = 6cm and $\angle ABC = 60^{O}$. Also construct a triangle equal to the area of the quadrilateral.

b) Find the area of the triangle so constructed.

14. A 40m high pillar is fixed in the center of a circular pond such that angle of depression to the point of circumference from the top of tower is found to be 30^{O}. Then, answer the following. [1+2+1]

a) Draw a diagram to represent the context.

b) Find the radius of pond.

c) What will be the diameter of pond if the angle of depression from the top of tower is found to be 45^{O}?

15. The marks obtained by students in an exam out of 60 marks is given in the table below. [1+2+1+1]

Marks	10–20	20–30	30–40	40–50	50–60
Number of students	4	5	7	5	2

a) Find the median class of given data.

b) Find average marks obtained by students.

c) Find mode of the given data.

d) In this context do mean, mode and median lie in same class? Justify.

16. Among 20 students, 11 are girls and 9 are boys. Two students are chosen for a programme. [1+2+1+1]

a) State the addition law of probability.

b) Find the probability of getting at least one boy participate in the program.

c) Show the probability of all events of getting boy or girl participate in the program in a tree diagram.

d) By what percentage is the probability of getting both students as girls more or less than getting both students as boys to participate in the program?

— THE END —