Class **Time: 3 hours** **F.M.: 75**

Attempt all the questions.

1. If U = {x : x < 10, x ∈**N**} is a universal set, A = {x: x is a factor of 6}, B = {y: y is a prime number} and C = {z: z is a multiple of 3} are the subsets of U.

(a) What is the cardinal number set U? **[1]**

(b) Write (A ∩ B) in listing method. **[1]**

(c) Find $\overline{(A \cup B) - C}$ and illustrate it in a Venn-diagram by shading. **[3]**

(d) If C = {4, 7, 8, 9}, what will be the relation between A ∪ B ∪ C and U? **[1]**

2. Mr. Yadav buys 100 cycles of same model from India and marked each cycle with price Rs 5,000. He allows 10% discount in each cycle and sells all the cycles by levying 13% VAT.

(a) What is the formula to calculate the price of cycle after allowing discount? **[1]**

(b) Calculate the selling price of all cycles with VAT. **[2]**

(c) If he deposits half of the selling price of all cycles excluding VAT in a bank for next one year at 12% p.a., how much net interest will he get if 5% of interest is charged as income tax%? **[2]**

3. A group of youths returned from foreign employment of a village wished to run a mini-hydro company to uplift the economic status of the villagers. They sold 4,00,000 shares each of Rs. 100. After 1 year, the company made a net form of Rs. 25,00,000 and the management committee of the company decided to distribute Rs. 5,00,000 cash dividend among the shareholders.

(a) From which amount is the cash dividend distributed? **[1]**

(b) What percent of cash dividend was distributed? **[1]**

(c) How much cash dividend would Janak get at the same rate if he had 4,800 shares and the net profit of the company was Rs. 30,00,000? **[2]**

4. The table given below shows the rate of electricity charge with service charge for a 5A meter box.

Case	kWh (units)	Service charge	Energy charge/unit
Consumed units is up to 20 units	0-20	Rs. 30.00	Rs. 0.00
Consumed units exceeds 20 units	0-20	Rs. 30.00	Rs. 3.00
	21-30	Rs. 50.00	Rs. 6.50
	31-50	Rs. 50.00	Rs. 8.00

A 5A transmission line is connected in Bina's house, and the meter reading of 1 Bhadra and 1Aswin was recorded as 01045 units and 01070 units respectively. The electricity office is at a distance of 2 km from Bina's house. The minimum fare of taxi is Rs. 14 and fare per 200 meter is Rs 7.20.

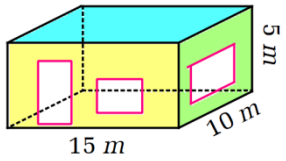
Answer the following questions.

(a) How many unit of electricity was consumed in Bhadra? **[1]**

(b) What was the electricity bill of the month Bhadra? **[2]**

(c) If she used the taxi to go to the electricity office for paying the bill, how much fare did she pay for the taxi? **[1]**

5. In Geetanjali Secondary School, the room of class IX is rectangular in shape. It is 15 m long, 10 m broad and 5 m high. Also, it contains two windows of size 2 m × 1.5 m each and a door of size 1 m × 4 m.



(a) Write down the formula to calculate the area of four walls. **[1]**

(b) What is the area the ceiling of the room? **[1]**

(c) Find the cost of colouring its walls excluding the windows and door at Rs 250 per sq. metre. **[2]**

(d) By how much more or less does it require to papering the walls at Rs. 275 per sq. metre than couloring? **[1]**

6. On a sunny day, Mr. Shah was working in the field. He went to a store and bought a cylindrical can completely filled with pineapple juice. The inner radius of base of the of can was 5 cm and height 14 cm.

(a) What is the formula to calculate the volume of the can? **[1]**

(A) $\pi r^2 h$ (B) $\frac{1}{3}\pi r^2 h$ (C) $2\pi rh$ (D) $2\pi r(r + h)$

(b) How many liter of juice was filled in the can? Find it. **[3]**

7. Gopal's house was completely destroyed due to the devastating earth-quake on 12 Baishakh 2072 B.S. An organization distributed the canvas for making the tent. He made an equilateral triangular tent by using the canvas including the floor for the temporary shelter. The edge of the triangular face was 12 ft. each and length of the tent was 20 ft.

(a) How many square feet of canvas was given to him? **[2]**

(b) By how many feet would the length of tent be increased if he didn't use the canvas on the floor? **[2]**

8. In a Boost up Test of mathematics held on last Sunday in a school, the marks obtained by a group of students are 16, 24, 36, …., 81.

(a) What is the formula to find the general term of a geometric sequence? **[1]**

(A) $t_n = a + (n-1)d$ (B) $t_n = a + (n-1)r$

(C) $t_n = ar^n$ (D) $t_n = ar^{n-1}$

(b) What is the common ratio of the sequence of marks? **[1]**

(c) How many students are there in the group? **[2]**

9. Solve the following problems.

(a) Find the H.C.F. of $8a^3 + b^3$ and $16a^4 + 4a^2b^2 + b^4$ **[3]**

(b) Simplify: $\sqrt[a+b]{\frac{x^{a^2}}{x^{b^2}}} \times \sqrt[b+c]{\frac{x^{b^2}}{x^{c^2}}} \times \sqrt[c+a]{\frac{c^{a^2}}{x^{a^2}}}$ **[3]**

10. Zeena bought 3 kg of apples and 5 kg of oranges for Rs 1155 from a fruit corner. At the same time, Chhiring bought 2 kg of oranges with the price of 1 kg of apples from the same corner.

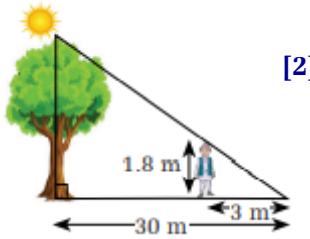
(a) Represent the given statements in linear equations. **[1]**

(b) Find the rates of cost of apples and oranges per kg. **[2]**

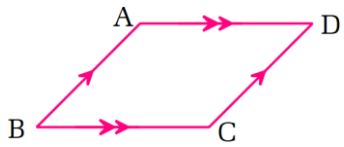
(c) If the rate of cost of oranges is decreased by 10% and that of apples is increased by 20%, how many kg of oranges and apples of equal quantity can be bought with Rs. 5544? **[2]**

11. (a) Draw two triangles ABC of different shapes and sizes. Explore the experimentally the relation between the sum of any two sides and the third side. **[3]**

(b) A boy 1.8 m tall casts the shadow of length 3 m at 2:30 p.m., what is the height of the tree which casts the shadow of length 30 m at the same time? **[2]**



12. A parallelogram ABCD is given aside.



(a) What is the relation between the diagonals of parallelogram? **[1]**

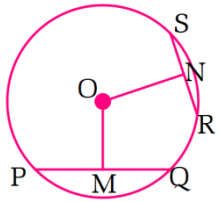
(A) Equal (B) perpendicular to each other

(C) bisect each other (D) bisect each other perpendicularly.

(b) If $\angle ABC = (30^\circ + p)$ and $\angle ADC = (60^\circ - p)$, what is the value of p? Find it. **[1]**

(c) Construct a rhombus ABCD in which diagonal AC = 6 cm and diagonal BD = 8 cm. **[2]**

13. Dipesh draws a circle with centre O and radius 5 cm. He draws a chord PQ of length 6 cm and mark the mid-point M of it. Also, he draws another chord RS and joins centre O to the mid-point N of it.



(a) What is the relationship between OM and PQ? **[1]**

(b) Find the length of OM. **[2]**

(c) How should the chord RS be equal to the chord AB with respect to OM and ON? Give reason. **[1]**

14. Last week, the mathematics teacher of Children Park English Secondary School administered a class test for class-IX students. He recorded the marks obtained by students in the following table.

Marks obtained	15	30	45	60	75	90
No. of students	2	3	7	10	8	4

(a) What type of data is it? **[1]**

(b) Construct a cumulative frequency distribution table? **[1]**

(c) Calculate the median mark. **[2]**

(d) What is the average mark of students who secured more than median mark? **[2]**

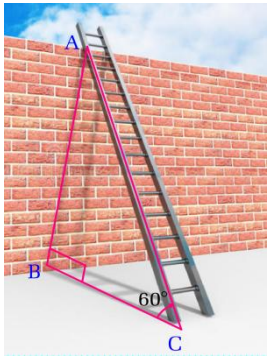
15. A mathematics teacher divides the students into groups of 6/6 students. He rolls a die to select the student of a particular group for solving certain question in the board. If he rolls the die once, answer the following questions.

(a) Write down the sample space for the above experiment. **[1]**

(b) What is the probability of selecting the students numbered by an even number? **[2]**

(c) What is probability of not selecting the students numbered by multiple of 3? **[2]**

16. In the given figure, a right angled triangle ABC is formed when a ladder AC is rest against a vertical wall AB making an angle of 60^o with the ground. The length of the ladder is 18 ft.



Answer the following questions:

(a) Which trigonometric ratio is represented by $\frac{AB}{AC}$? **[1]**

(b) What is the value of $\tan 60^o$? **[1]**

(c) What is the length of BC? **[1]**

(d) What will be the size of angle ACB when the wall AB and the distance of the foot of the ladder from the base of wall (BC) are equal? **[1]**

♠♠♠ … **The End …** ♠♠♠