

Spring Semester Examination – 2019

Paro College of Education

Royal University of Bhutan

Paro

Module: MAT 404 (Mathematics in Upper Primary 2) **Programme** B. Ed (P) **Level:** IV

Writing time: 3 hours

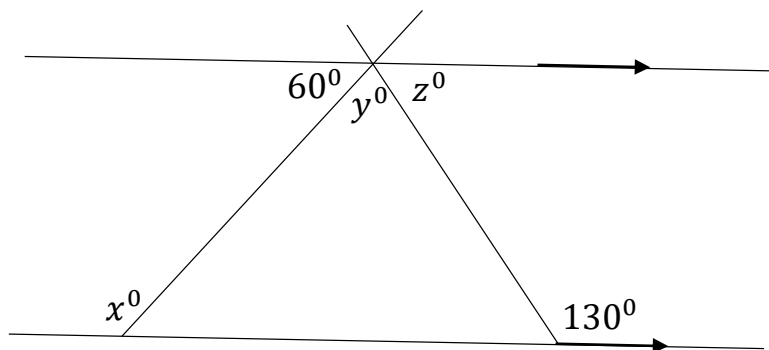
Full marks: 100

Direction:

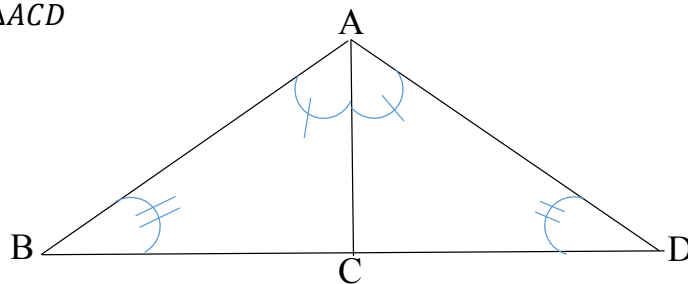
Do not write during the first 15 minutes. Use this time for reading the questions. You will get three hours for answering the questions. Write the answers to all the questions in the answer sheets provided. This paper contains SIX questions. Attempt any FIVE questions. All questions carry equal marks and the intended marks are given in brackets. You are NOT allowed to use any electronic devices such as calculators, mobile phones etc. You will be supplied with grid papers, Isometric dot or grid and graph papers to answer some of the questions.

Question 1

- a. Use a pair of compasses and ruler to construct a triangle PQR where $PQ = 6$ cm, $PR = 7$ cm and angle $PQR = 105^\circ$. Show all arcs, points clearly. [6]
- b. Find the values of x , y and z from the figure below. Show all justifications and calculation. [8]



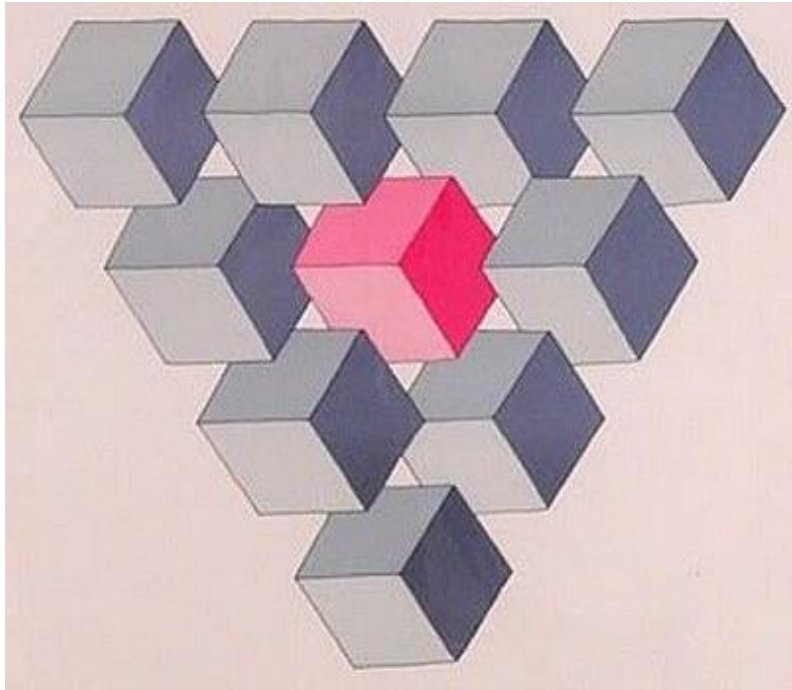
- c. Show that $\triangle ABC \cong \triangle ACD$ [6]



Question 2

- a. Draw the object using isometric dot paper.

[6]



- b. The coordinates of the figure ABCD are A(1, 4), B(2, 6), C(3, 4) and D(2, 5). [1+2+3+2]

- Plot the figure ABCD and write its coordinates.
- Translate the figure ABCD to $A'B'C'D'$ as per the function:
 $(x, y) \rightarrow (x + 3, y - 2)$
- Rotate the image $A'B'C'D'$ 90° clockwise.
- Reflect the image $A'B'C'D'$ to $A''B''C''D''$ in the X-axis.

- c. Factor $4x^2 + 14x + 6$ by using:

[3 + 3]

- algorithm
- algebra tiles

Question 3

a. Draw the following figures using isometric dot paper.

[4 + 4]

i.



ii.



- b. Derive the formula for the following with the help of appropriate illustrations: [4 + 4]
- Area of a circle
 - Total surface of a cylinder
- c. What would be the area of the circular path of college flower garden, if the outer diameter is 28 m and the path is uniform width of 3.5 m? [4]

Question 4

- a. Two dice are rolled. What is the probability that: [3 + 3 + 2 + 2]
- the sum is prime number?
 - the product is composite number?
 - the difference of the two is 2?
 - the quotient of the two is 3?
- b. A pencil bag contains 3 red, 5 green, 2 blue and 6 yellow pencils. A pencil is chosen at a random from the jar. After replacing it, a second pencil is chosen. What is the probability of choosing: [2 ½ + 2 ½ + 2 ½ + 2 ½]
- green pencil?
 - green and yellow pencil?
 - red or blue pencils
 - green or yellow pencils

Question 5

- a. Solve the following by using algebra tiles and algorithm: [5 + 5]
- $(-2x^2 - xy + 9x + 3y^2 + y - 10) \div (-x + y + 2)$
 - $2x + 2y = -2$
 $3x - 4y = 18$
- b. Norbu is a Class V student. She was asked to convert 5 km^2 to m^2 . Norbu's solution was: $5 \text{ km}^2 = 25 \text{ m}^2$. [3 + 3]
- Find Norbu's mistake (s) and explain.
 - How will you teach Norbu the right method to convert km^2 to m^2 . Explain.

- c. Create a story for the equation given below and solve it using tiles. [2 + 2]

$$x + (x + 30) = 270$$

Question 6

- a. A number is chosen at random from the set of two-digit numbers from 10 to 39 inclusive. What is the probability that: [2 +2 +2 +2]

- the number contains at least one digit is 3?
- multiples of 4 and multiples of 5?
- multiples of 3 or multiples of 6?
- the numbers are factors of 48?

- b. Prove that $(a + b)^2 = a^2 + 2ab + b^2$ showing all your construction and solution in detail. [6]

- c. There are 4 plots with the following dimension. All the plots are in the urban area. Choose one plot to construct a house. Explain why you chose that particular plot. Your answer has to be logical and mathematically correct. [6]

