

Semester End Examination
Paro College of Education
Royal University of Bhutan

Module: EAS202, (Supporting Mathematical Thinking) **Programme:** Diploma (ECCD) **Level:** II

Writing Time: 3 hours

Full mark: 100

DIRECTION: *This question paper consists of two sections, A and B. Section A consists of selected-response type questions and section B consists of constructed-response type questions. The weighting for Section A is 20 marks and section B is 80 marks. Every question in section A is worth 2 marks and section B 16 marks. The intended marks for the questions in section B are given alongside every question. Instructions for each section are mentioned accordingly. You are **NOT** allowed to carry/use any electronic devices to answer the questions.*

SECTION – A ($10 \times 2 = 20$ marks)

INSTRUCTION: *Answer all the sub-questions numbered a to j. Choose only one answer for each sub-question and write in the answer script against the question number.*

Question 1

- a. A prekindergarten teacher uses a basket of red and yellow apples to reinforce concepts during a mathematics lesson. Which of the following tasks is best targeted at teaching students to compare quantities?
- A. Having students count all the apples in the basket
 - B. Having students make a Venn diagram for the colour of the apples
 - C. Having students put one apple in the middle of the place mat on their desks
 - D. Having students determine whether the numbers of red and yellow apples are equal
- b. The fuel tank in a car holds 42 litres when full. If there are 17 litres of fuel in the tank, how many litres of fuel are needed to fill the tank?

Which of the following is most appropriate to use to correctly answer the question above?

- A. Division
- B. Addition
- C. Subtraction
- D. Multiplication

- c. A kindergarten teacher has students determine the following.
- How many students are absent that day
 - If there are enough snack cups for each student to have one during snack time
 - How many balls are taken outside during recess and how many are brought back inside after recess.

Which of the following concepts is most closely aligned with the determinations the teacher is having the students make?

- A. Ordering
 - B. Counting
 - C. Patterning
 - D. Classifying
- d. A pre-school teacher is planning activities to introduce students to nonstandard units of measurement. Which of the following activities will best meet the teacher's goal?
- A. Asking students to use pencils to measure the length of a desk
 - B. Asking students to stand in a line, from the shortest person to the tallest
 - C. Asking students to use a measuring tape to measure the length of the classroom door
 - D. Asking students to determine how many one-litre bottles of water can fill a small bucket
- e. A Vocational Education and Training School offers one-year Vocational Education and Training (VET) courses. Courses may be taken at one of three levels: Certificate I, II or III. Students may enrol for only one certificate within each school year.

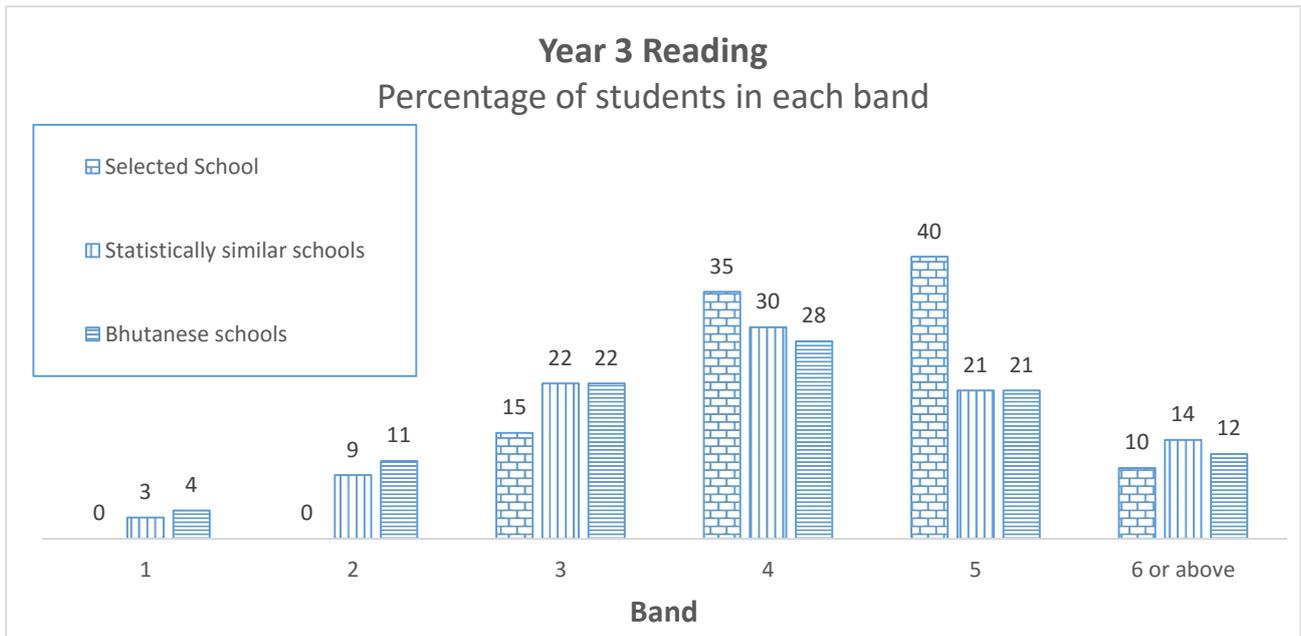
This table compares the number of students enrolled in one of the courses with the number of students who completed a qualification in that course.

	Certificate I	Certificate II	Certificate III	Total
Number of students enrolled in January 2016	97	18	5	120
Number of students completed in December 2016	50	13	3	66

What percentage of the total enrolments completed VET Certificates at the school in December 2016?

- A. 52%
- B. 72%
- C. 55%
- D. 60%

- f. The graph below shows the percentage of Year 3 students in six achievement bands for reading, of a selected school. It also shows comparable percentages of statistically similar schools and for all Bhutanese schools.



Given below are some statements about the graph.

- i. A higher percentage of Year 3 students at the selected school achieved at Band 4 compared to students at statistically similar schools.
- ii. At the selected school, more Year 3 students achieved at Band 4 than at any other band.
- iii. A greater percentage of the Year 3 student at the selected school achieved above Band 3 compared to year 3 students at statistically similar schools.

Which of the following is correct about the above statements in the sequence as is given with regard to the graph shown?

- A. True, True, False
- B. True, False, True
- C. False, False, True
- D. False, True, False

- g. A preschool teacher has each of the ten students in the class pick their favourite colour of sticky note from red, yellow and blue notes. Students then work with the teacher to create a chart of their colour selections, (Fig. A).

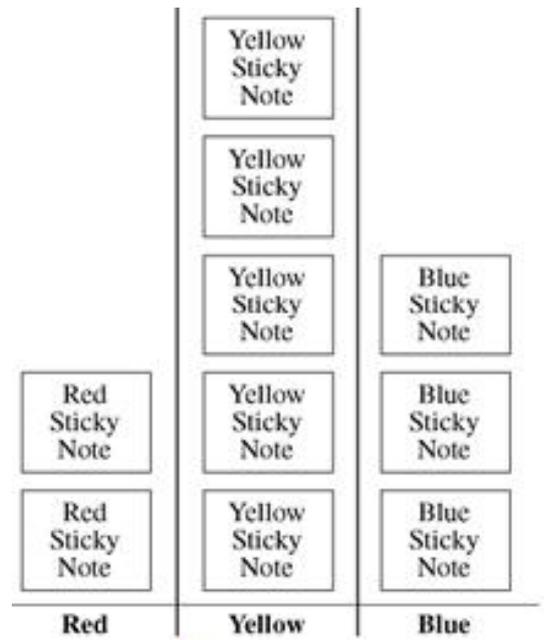


Fig. A

Which of the following math skills does the activity best reinforce?

- A. Pattern recognition
 - B. Conservation of numbers
 - C. Intuitive concepts of chance
 - D. Data collection, organization, and display
- h. Here is a schedule of costs for Gym and Swim membership at a sports facility.

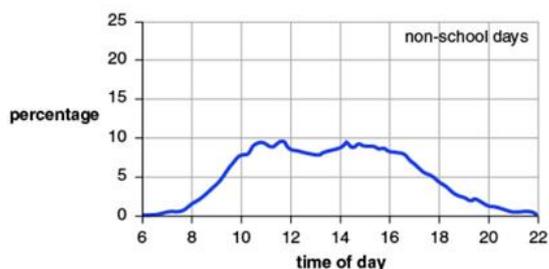
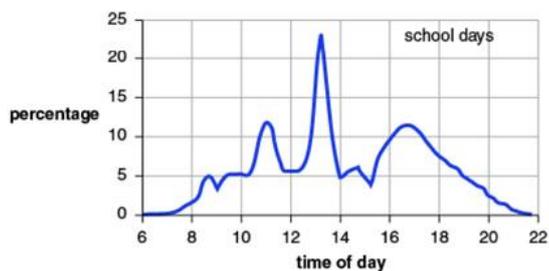
Payment mode	Fees structure		
	Gym only (Nu.)	Swim only (Nu.)	Gym & Swim (Nu.)
12 months (upfront)	38,740	29,965	50,245
12 months (monthly debit)	3,315	2,145	4,290
6 months (upfront)	21,450	19,175	32,630
Casual (per visit)	780	325	975

All of the following statements are TRUE about the above Gym and Swim facility EXCEPT;

- A. Comparatively 12 months – upfront payment mode membership is better than any other membership options
- B. Overall, casual - per visit payment mode membership is the most expensive for availing the facilities
- C. 12 months - monthly debit payment mode membership is the best deal for availing the facility
- D. 6 months – upfront payment mode membership is a better option for availing the facilities.

- i. The graphs below show the percentage of children (11 – 13 years) playing sport at different times during school days and during non-school days in a certain school.

Percentage of Children Playing Sport



Given here are three statements about the graphs:

- I. On school days, the highest percentage of children playing sport at any one time is less than 25%.
- II. At any given time on a non-school day, approximately 90% or more of children were **not** playing sport.
- III. At 5 pm, fewer children were playing sport on school days than on non-school days.

Which of the following is correct about the above statements in the sequence as is given with regard to the graphs shown?

- A. False, False, True
 - B. True, True, False
 - C. False, True, True
 - D. True, False, True
- j. A prekindergarten teacher is planning a lesson with a teaching objective of categorizing geometric objects by type of shapes. Which of the following actions must children be able to perform successfully before the teacher teaches the lesson?
- A. Identifying attributes of objects
 - B. Recognizing the position of the shapes
 - C. Creating sets of different sizes of objects
 - D. Matching values with their numerical representatives

SECTION B ($16 \times 5 = 80$ marks)

INSTRUCTION: *There are SIX questions in this section. Answer any FIVE questions. Sub-questions must be answered in order and completely for every question attempted.*

Question 2

- (a) List all the principles of counting. Elaborate any one of the principles giving suitable examples. Use diagrams/illustrations as necessary to support your response. [2.5 + 5.5 = 8]
- (b) i.) Explain how important it is for us to put young children through appropriate and rich experiences and exposure to geometric world with suitable examples.
- ii.) Mention all the daily activities that you provide at your centre in relation to geometric experiences. [5+3 = 8]

Question 3

- (a) Give an account of how you designed and executed an activity or a set-up at any one play corner/area that reinforced and facilitated children's skills and understanding of any or several of the measurement aspects. [8]
- (b) Choose any two from the following given pre-number ideas and describe a short activity each in context of early years' mathematics learning experiences. [2 × 4 = 8]
- i. Matching
 - ii. Sorting
 - iii. Comparing
 - iv. Ordering

Question 4

- (a) Explain how building blocks/blocks area can help in developing young children's mathematical skills and concepts. Use suitable diagrams/illustrations and relevant examples to support your answer. [8]
- (b) Describe in general, the use of computers and technology in context of early childhood mathematics, how it would enable young children learn more meaningful mathematics. You can also mention about how you have used in your centre practice. [8]

Question 5

- (a) Design an appropriate activity of reasonable length to help young children develop skills and experience meaningful mathematical learning in particular measurement. [8]
- (b) Explain any two principles of counting in greater detail, exclude the one mentioned in Q2 (a) if attempted. Use illustrations and relevant examples as required. [8]

Question 6

- (a) Explain how you as an educator at the centre can provide young children, as many pattern experiences as possible. [8]
- (b) Design a simple activity or a set-up of an area/corner in which your focus of children's engagement and learning outcomes is on the development of data and chance. Give necessary illustrations and explanations as required. [8]

Question 7

- (a) Elaborate on the opportunities and experiences that young children are exposed to learning mathematical skills and concepts meaningfully from other learning areas/corners apart from the blocks play. [8]
- (b) i). As an adult/educator, explain your understanding of 'what it means to measure', and how this understanding informs you to help your children at the centre enabling them to understand the measurement concept.
- ii). List six measurement aspects/topics that we can integrate in young children's play context/areas. [5+3 = 8]