Government of Nepal
Teacher Service Commission
Open Competitive Examination 2078
Sample Question

Level: Lower Secondary   Full Marks:100
Subject: Mathematics   Pass Marks: 40
                                                                                         Time: 3hrs

Attempt all questions

Section A

1. Suppose you are assigned to teach grade 6-8. How do you explain why the students should follow the steps given below? Use suitable examples and pictures to explain your answer.
    a. While a fraction is divided by another fraction, second fraction is inverted, and the division sign changes into the multiplication sign. [5]
    b. In factorization of algebraic expressions $4x^2 + 10x - 6$, why is the coefficient of x changed to (p-q) where p>q, p and q are factors of product of 4 and 6. [5]

2. A mother of grade 8 student complains, "My daughter Noopur does not show interest in learning Mathematics. I want to make her an Engineer and I want to motivate her to learn Mathematics". Noopur says, "I cannot learn Mathematics, it is beyond my strength". In this context, taking the Piaget's theory of cognitive learning as reference, how do you teach surface area of a prism for students like Noopur? Write the important activities for your lesson plan. Also make three test items of Comprehension, Application and Higher order thinking level as per Bloom's taxonomy to evaluate students during teaching. [7+3]

3. Justify with strong reasons why it is imperative to use different forms of instructional materials while teaching Mathematics. Suppose you have to teach congruency of triangles in grade 8. How do you justify requirement of various teaching materials in this lesson? Write with suitable examples. [5+5]

Section B

4. Differentiate permutation and combination with practical examples. Explain how principles of mathematical induction is important in inducing mathematical concepts in lower secondary.

5. In Statistics, students seem to be able to calculate various measures, but they fail to implement them in real life. In this context, answer the following questions:

   (a) What are the conditions to choose two types of correlation coefficients (Pearson and Spearman)? Write with practical examples. [4]

   (b) Suppose you have calculated two months of attendance of five randomly selected students. Their unit test results are presented in a table, which is given below:

X	10	20	30	40	50
Y	20	30	40	30	50

   Calculate the Pearson's correlation coefficient of the above data and interpret the correlation. What conclusion do you draw from the correlation coefficient? 6

6. Theoretically, we know that Euclidian Geometry is the foundation of all other forms of Geometry. Practically, its concepts- area and perimeter of a plane figures, are highly applicable to solve real-life problems. Respond to the following questions:

   (a) Provide evidence to justify that Euclid's fifth postulate contributes to extend other forms of geometry. [4]

   (b) A wealthy and wise landlord was happy with his employee from his hard work. The landlord gave him a 100 m long rope and asked the employee to take as much land as the rope could cover. In your opinion, which one of the two land-shapes: square and circular, will cover the maximum land? Give your arguments with calculation. [6]

द्रष्टव्य: पाठ्यक्रमको खण्ड क बाट पूर्णाङ्क ५० का ५ प्रश्न र खण्ड ख बाट पूर्णाङ्क ५० का ५ प्रश्न गरी १०० पूर्णाङ्कको परीक्षाका लागि यस्तै प्रकृतिका प्रश्नहरू दिइने छ ।