



SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Accountancy (New)

First Year, First Semester Examination – 2017

1102: Business Mathematics

Instructions for candidates:

Answer **five** questions **only**.

All questions carry **equal** marks.

No. of questions : 06

No. of pages : 05

Time : **Three hours**

Question 01

(i) Simplify $\frac{(\sqrt{x})^5 \times (\sqrt[5]{x})^3}{(\sqrt[3]{x})^2}$.

(ii) Using difference of two squares, find the value of 99.97×100.03 .

(iii) If $x + y = 7$ and $xy = 12$, then find the amount of $x^2 + y^2$.

(iv) Express 128 using base 8.

(v) Divide Rs. 5670 among Nimal, Kamal and Sunil such that Kamal gets twice the amount that Nimal gets and Sunil gets three times the amount that Kamal gets.

(4 x 5 = 20 Marks)

Question 02

(i) A person buys a lot of items for Rs. 120000. He keeps 20 items for his use and by selling the rest of items at Rs. 500 per item the cost of the lot was recovered. How many items did he buy?

(ii) Product of two consecutive multiple of 7 is 1470. Using an equation find two multiple of 7.

(iii) A person is appointed to a post with an initial salary of Rs. 37000 per month and with an annual increment of Rs. 800 for the first 5 years and Rs. 1200 after first 5 years. Find the salary of that person in the ninth year of his service.

(iv) Income from registration department of ATI Jaffna decreases every year by 10% of the income it earned in the previous year. The income of that department in 2015 was Rs. 72000. Find the expected income in 2020.

(5 x 4 = 20 Marks)

Question 03

(i) Due to water pollution the fish in a large lake will reduce by 6% per annum. How long will it take (in years) for the number of fish alive in that lake to reduce exactly by half of the numbers existing currently?

(Marks 6)

(ii) A person has lent Rs. 20000 at 10% rate of simple interest per annum and Rs. 35000 at a 15% rate of simple interest for a period of 3 years. Calculate the expected total interest.

(Marks 6)

(iii) A person deposits Rs. 4000 at the beginning of each year for the next 5 years at 12% rate of simple interest. Find the total amount in this account

(a) at the end of fifth year

(b) at the beginning fifth year,

(Marks 8)

(Total 20 Marks)

Question 04

(i) A person invests Rs. 90000 and expects a return of Rs. 25000 from this investment at the end of first year, Rs. 40000 at the end of second year and Rs. 45000 at the end of third year. If the discounting rate is 15% then determine whether this investment is profitable or not.

(6 Marks)

(ii) A person wants to buy a TV set. Its marked price is Rs. 64000 and down payment is Rs. 16000. He gets one year to settle the balance in monthly payments (at the end). By considering charging rate as 12%, find the monthly installment.

(7 Marks)

(iii) In a private bank interest rate is 18% per annum . A person wishes to invest a fixed amount at the beginning of each month and hope to collect Rs. 40000 at the beginning of the 18th month of his investment. Find the monthly instalment.

(7 Marks)

(Total 20 Marks)

Question 05

(i) Using binomial theorem expand $(2x - 1)^5$.

(6 Marks)

(ii) A student wants to select 8 questions out of 10 questions and answer for an examination. If first 3 questions are compulsory, then in how many ways can he choose the questions?

(4 Marks)

(iii) Evaluate the following limits:

(a)
$$\lim_{x \rightarrow 3} \frac{x^2 - 7x + 12}{x^2 - 5x + 6}$$

(b)
$$\lim_{x \rightarrow \infty} \frac{3x^2 - 7}{2x^2 + 5x + 1}$$

(6 Marks)

(iv) In a certain production demand curve is $p = q^2 - 14q + 200$ and the supply curve is $p = 5q + 350$, where p is the price and q is the quantity. Obtain the equilibrium price and equilibrium quantity.

(4 Marks)

(Total Marks 20)

Question 06

(i) Differentiate the following functions with respect to corresponding variables:

(a) $y = (2x^2 + 3)(x^2 - 5x + 2)$.

(b) $y = (3t + 5)^5$

(c) $y = \frac{x^2 - 4}{x^2 + 4}$

(8 Marks)

(ii) In a certain production cost function $c = 7q + 10$ and the revenue function $R = 14q - q^2$, where q is the production level. Calculate the production levels at breakeven points.

(6 Marks)

(iii) Using integration find the area under the curve $y = x^2 + 3$ from $x = 1$ to $x = 3$.

(6 Marks)

(Total Marks 20)