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SCHOOL OF ACCOUNTING AND BUSINESS BSc. (APPLIED ACCOUNTING) GENERAL / SPECIAL DEGREE PROGRAMME

YEAR I SEMESTER I – INTAKE VIII (GROUP B) END SEMESTER EXAMINATION – JUNE 2017

QMT 10130 Business Mathematics

Date	:	09th June 2017
Time	:	5.30 p.m. – 8.30 p.m.
Duration	:	Three (03) hours

Instructions to Candidates:

- Write the Index Number in the space provided at the top of this sheet. Do not write your name anywhere in this question paper.
- This paper consists of three parts (I, II and III).
- Answer **ALL** the questions.
- The total marks for the paper is 100.
- The marks for each question are shown in brackets.
- Use of scientific calculator is allowed.
- Answers should be written neatly and legibly.

PART I

Answer ALL Questions.

Question No. 01

Underline the correct answer.

i. Total cost of producing X units of a product is given by

$$TC = 0.4X^2 - 8X + 640$$

Find the level of output at which the average cost will be minimum.

- a. 10b. 25c. 40
- d. 80
- ii. The demand for a product produced by a firm is given by

$$5P + 3X = 96$$

Find the level of output which maximize the total revenue.

- a. 12
- b. 16
- c. 24
- d. 32
- iii. Monthly salary received by an employee working in *ASHWEE GARMENTS (PVT) Ltd.* in her first four years were

Rs. 25,200 Rs. 26,400 Rs. 27,600 Rs. 28,800

What will be the monthly salary she is receiving in her ninth year?

- a. Rs. 34,800
- b. Rs. 35,000
- c. Rs. 36,000
- d. Rs. 37,200

iv. A person deposited Rs. 250,000 in a 'one month fixed deposit' on 1st January 2017 and allows it to renew at maturity with the interest at the end of each month. According to the bank statements the interest he received in first three months are

Rs. 2500.00 , Rs. 2525.00 , Rs. 2550.25

He decides to withdraw the total interest received in the fixed deposit at the end of the sixth month. Find the total interest he can withdraw from this fixed deposit.

- a. Rs. 15,380
- b. Rs. 15,533
- c. Rs. 19,289
- d. Rs. 19,481
- v. A manufacturer sells his products at Rs. 18/- per item. His fixed cost is Rs. 1800/- per day and the variable cost is Rs. 12/- per item. Find the break-even point for the manufacturer.
 - a. (60, 2520)
 - b. (100, 3000)
 - c. (300, 5400)
 - d. (600,9000)
- vi. *THAKUSIKA(PVT) Ltd.* will expect a fixed expense of Rs. 43,200 and variable expense of Rs. 48,000 for sales worth of Rs. 75,000 in next month. What will be the break-even level of sales for the company.
 - a. Rs. 16,000
 - b. Rs.67,500
 - c. Rs.120,000
 - d. Rs.154,000
- vii. National Investment bank in Sudaroliya is paying 12% annual interest rate for three month fixed deposits. Calculate the effective interest rate.
 - a. 3%
 - b. 6.09%
 - c. 9.27%
 - d. 12.55%

- viii. Find the Future Value of Rs. 250,000 after five years from today at 14% interest rate per annum compounded semi annually?
 - a. Rs. 350,638/-
 - b. Rs. 481,354/-
 - c. Rs. 491,788/-
 - d. Rs. 926,805/-
 - ix. A machine costing Rs. 50,000 has an estimated scrap value of Rs. 2,000 after 6 years. Assuming the reducing balance method of depreciation, calculate the depreciation rate.
 - a. 4%
 - b. 25%
 - c. 41.52%
 - d. 58.48%
 - x. An investment of Rs. 100,000 today yields Rs. 65,000 at the end of each year for two consecutive years. If a return of 15% per annum is expected from this investment, what will be the Net Present Value of this investment?
 - a. Rs. 1,702/-
 - b. Rs. 5,671/-
 - c. Rs. 7,373/-
 - d. Rs. 13,044/-

(Total 30 Marks)

PART II

Answer ALL Questions.

Question No. 02

Average cost function for a firm is given by

$$AC = 2X^2 - \frac{43}{2}X + 52$$

and the demand function is given by

$$2P + 5X = 150$$

where X is the level of output and P is the price.

i. Obtain the total revenue function, TR.

(04 marks)

- ii. If the government introduced a subsidy of Rs. 5/= per unit of output and assuming the cost will decline due to this subsidy, obtain the new average cost function, AC1.
 (02 marks)
- iii. Hence or otherwise obtain the total cost function, TC. (02 marks)
 iv. Obtain the profit function, π (02 marks)
 v. Obtain the profit maximizing level of output. (03 marks)

(Total 13 Marks)

Question No. 03

A machine costing Rs. 48,000 has an estimated scrap value of Rs. 9,600 after 8 years. Determine the book value of the machine after four years, using the

i. Straight line method (03 marks)
ii. Double declining method (04 marks)
iii. Sinking fund method which earns 5% annual interest compound annually

(07 marks)

(Total 14 Marks)

Question No. 04

A person is having two investment opportunities. The first investment costs Rs. 100,000 initially but yield Rs. 40,000 at the end of each six month for a period of two years. The second investment costs Rs. 140,000 initially but yield Rs. 50,000 at the end of every quarter for a period of one year.

i. Obtain the net present value of the first investment under the annual interest rate of 12% compound semi-annually.

(05 marks)

Obtain the net present value of the second investment under the annual interest rate of 12% compound quarterly.

(05 marks)

iii. Explain briefly which investment project the person should undertake?

(03 marks)

(Total 13 Marks)

Question No. 05

Sadun Jayanetti is planning to purchase a land worth of Rs. 1,000,000 in another five years to construct a house. Currently he is coordinating a degree program at a private institution for which he earns Rs. 60,000 at the end of each quarter. He will hold this position for another three years and willing to deposit his earnings from the coordinator-ship in a bank account which pays 12% interest per annum compounded quarterly. However, in another one year time he needs to buy a new computer worth of Rs. 100,000 using the funds he collected.

i. Determine the future value (at the end of 5 years) of his total savings.

(05 marks)

ii. What will be the future value (at the end of 5 years) of his spending for the computer.

(03 marks)

iii. How much more he requires at the end of the fifth year to purchase the land.

(02 marks)

(Total 10 Marks)

Part III

Answer ALL Questions.

Question No. 06

Mr. Tilakasiri is going to take a personal loan worth of Rs. 3,200,000 from Supipi Investment Bank. Bank allows him to repay the loan in equal monthly installments in five years period. For the loan balance, bank is charging an interest rate of 18% compound monthly.

i. What will be the value of the monthly installment.

(09 marks)

Period	Loan Balance	Interest	Monthly Installment
(month)	(at the start)		
1	3,200,000	-	-
2	-		
3			
4			
5			
6			

ii. Complete the following amortization schedule for the first six months.

(11 marks)

(Total 20 Marks)

FORMULA SHEET

Simple interest, I = P * n * r

Final total amount with compound interest, $A = P(1+r)^n$

Future value, $FV = PV(1+r)^n$

Present value, $PV = \frac{FV}{(1+r)^n}$

Effective interest rate , $i = (1+r)^n - 1$

Future value of an annuity, $FV = \frac{P}{r}[(1+r)^n - 1]$

Present value of an annuity,	$PV = \frac{P}{r} \Big[1 - \frac{P}{r} \Big]$	$\frac{1}{(1+r)^n}$
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At break-even point, Sales Amount = $\frac{Fixed \ Expence}{1 - Vatriable \ Expence \ per \ One \ Rupee \ Sales}$