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

# YEAR I SEMESTER I (Intake V- Group B) END SEMESTER EXAMINATION – DECEMBER 2015

## **QMT 10130 Business Mathematics**

Date	:	19th December 2015
Time	:	2.00 p.m 5.00 p.m.
Duration	:	Three (03) hours

## **Instructions to Candidates:**

- Answer <u>ALL</u> questions.
- This paper consist of Three (03) parts. Part I, II and III
- Allocated marks for each question is indicated.
- Total marks for the paper is 100.
- Formula sheet will be provided.
- Use of non-programmable electronic calculator is allowed.
- Answers should be written clearly with the required steps.

#### PART I

Circle the number of the correct answer in the answer sheet provided.

1. Average cost function for a firm is given by

$$AC = X^2 - 9X + 10$$

Find the level of output at which the marginal cost is minimum.

- i. 1.5
- ii. 2
- iii. 3
- iv. 4.5
- 2. The demand function for a firm is

$$3P + X = 48$$

Find the level of output which maximize the total revenue.

- i. 8
- ii. 18
- iii. 24
- iv. 48
- 3. A firm has the total revenue function

$$TR = 200X - X^2$$

And the total cost function

$$TC = -2X^2 + 550X + 20,000$$

Find the profit maximizing level of output.

- i. 100
- ii. 175
- iii. 225
- iv. 275

- 4. A company producing an item has a fixed cost of Rs. 20,000 per day. Variable cost per unit of output is Rs. 15 and selling price of an item is Rs. 25. Find the break-even point.
  - i. (500, 27500)
  - ii. (500, 32500)
  - iii. (2000,50000)
  - iv. (2000, 70000)
- 5. A company expects a fixed expense of Rs. 39,600 and variable expense of Rs. 46,200 when sales are expected to be of Rs. 84,000. Obtain the break-even level of sales.
  - i. Rs. 72,000
  - ii. Rs. 78,000
  - iii. Rs. 84,000
  - iv. Rs. 88,000
- 6. Find the simple interest to be earned for 5 years if Rs. 10,000 is invested at an interest rate of 8% per annum.
  - i. Rs. 2000
  - ii. Rs. 4000
  - iii. Rs. 5000
  - iv. Rs. 8000
- How much it should be invested to provide an annual scholarship of Rs. 7500 at the end of each year if money can be invested at 15% per annum and if the 1<sup>st</sup> scholarship is awarded one year from now.
  - i. Rs. 50,000
  - ii. Rs. 75,000
  - iii. Rs. 112,500
  - iv. Rs. 150,000

- 8. Find the present value of Rs. 12,500 which is expected to be received after 8 years from now, assuming the discount rate of 12% per annum compound annually.
  - i. Rs. 4495.43
  - ii. Rs. 5048.54
  - iii. Rs. 30949.53
  - iv. Rs. 34757.51
- 9. Annual interest rate for three months fixed deposits is 8% per annum. Find the annual effective interest rate.
  - i. 6.12
  - ii. 8.24
  - iii. 9.22
  - iv. 16.98
- 10. A machine costing Rs. 80,000 has a useful life for 10 years. Find the book value of the machine at the end of the first year if double declining balance method is used.
  - i. Rs. 64,000
  - ii. Rs. 51,200
  - iii. Rs. 72,000
  - iv. Rs. 76,000

(Total 30 Marks)

#### PART II

#### **Question No. 01**

Average cost function for a firm is given by

$$AC = 4X^2 - \frac{57}{2}X + 20$$

and the demand function is given by

2P + 3X = 100

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

i. Obtain the total cost function, TC.

ii. Obtain the total revenue function, TR.

iii. Obtain the profit function,  $\pi$ 

iv. Obtain the profit maximizing level of output.

(03 marks)

(03 marks)

(03 marks)

(03 marks)

(Total 12 Marks)

#### Question No. 02

A machine costing Rs. 95,000 has an estimated scrap value of Rs. 3,800 in twelve years time. Determine

		(Total 12 Marks)
		(04 marks)
iii.	rate of depreciation using reducing balance method	
		(04 marks)
ii.	annual deposit to a sinking fund earning 5% interest	
		(04 marks)
i.	annual depreciation using straight line method	

#### **Question No. 03**

A company has to select one of the three projects A, B, C with expected cash inflows as shown in the following table.

	Project A	Project B	Project C
End of year 1	40,000	-	-
End of year 2	30,000	-	-
End of year 3	-	60,000	-
End of year 4	-	-	260,000
End of year 5	60,000	180,000	-

Initially the cash outflows for the three projects A, B and C are estimated as Rs. 80000, Rs. 110000 and Rs. 100000 respectively and the company also expects a return of 12% per annum.i. Find the net present value of the cash flows for the three projects.

(12 marks)

ii. Which project should the company be selected.

(01 mark)

(Total 13 marks)

#### **Question No. 04**

A man decided to collect Rs. 2,000,000 to purchase a vehicle and opened a bank account for the purpose which pays 12% interest per annum converted in every three months.

i. How much he has to save quarterly if he wishes to reach his target within five years.

(04 marks)

ii. If he can save Rs. 100,000 at the end of each quarter how long it will take to reach his target.

(05 marks)

iii. If he makes regular deposits of Rs. 100,000 at the end of each quarter what will be the special deposit he has to make at the final quarter.

(04 marks)

(Total 13 Marks)

## PART III

#### **Question No. 01**

*WEESHA ELECTRONICS* offers 32 inch LED televisions for Rs. 32000 on outright payment. However, the same is offered for a Rs. 2000 initial payment plus twelve (12) equal monthly installments paid at the end of each month over a year. *WEESHA ELECTRONICS* charges 18% interest per annum converted monthly for the balance to be paid in monthly installments. i. Find the value of the monthly installment

(02 marks)

Period	Outstanding	Interest for	Installment	Capital Paid
(month)	Principal at the	the month	paid	
	beginning			
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				

ii. Complete the following amortizing schedule.

(18 marks)

(Total 20 Marks)

#### FORMULAE SHEET

Simple Interest, I = P \* r \* n

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 annual 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 ,  $PV = \frac{P}{r} \left[ 1 - \frac{1}{(1+r)^n} \right]$ 

At break-even point, Sales amount =  $\frac{Fixed \ Expense}{1 - Variable \ expense \ per \ rupee \ of \ sales}$