Name:________________________________

								$Math - 131$ $Term - 093$ $SUMTW$ $9:20$ am	$Section$ 01 $10:20$ am

$CODE$ 001	$CODE$ 002	$CODE$ 003	$CODE$ 004	$MARKS: 126$ $Time: 2Hours$	$SERIAL$ $Number$		

NOTE: 1. The questions are not in any order of difficulty at all. 2. All questions carry equal number of marks. 3. Only the nonprogramable calculators are allowed. 4. All types of PAGERS, OR MOBILES ARE NOT ALLOWED to be with you during the examination. 5. Use an HB 2 pencil. 6. Use a good eraser. Do not use the eraser attached to the pencil. 7. Write your name, ID number and Section number on the examination paper and in the upper left corner of the answer sheet. 8. When bubbling your ID number and Section number, be sure that bubbles match with the number that you write. 9. The test Code Number is already typed and bubbled in your answer sheet. Make sure that it is the same as that printed on your question paper. 10. When bubbling, make sure that the bubbled space is fully covered. 11. When erasing a bubble, make sure that you do not leave any trace of penciling. 12. Count that the Examination has TWENTY-ONE Questions and FOURTEEN Pages. 13. Please BUBBLE carefully only right answer letter (A or B or C or D or E) corresponding to the correct answer to each question in the enclosed computerized Omar Sheet, with pencil only. 14. Please do not leave any question unbubbled in the Answer Sheet. 15. Please check that the version of your question paper and the answer sheet enclosed with it matches correctly. The versions are Code: 001, Code: 002, Code: 003, Code: 004.

==

Compound Interest Formulae: $S = P(1+r)^n$, $P = A(1+r)^{-n}$.

Effective Interest Formula: $r_e = \left(1+\frac{r}{n}\right)^n - 1$.

Continuos Interest Formula: Present $P = Ae^{-rt}$. Effective Interest Formula: $r_e = e^r - 1$.

Ordinary Annuity Formulae (End): Future Value = $S = R.\left[\frac{(1+r)^n - 1}{r}\right]$.

Present Value: $A = R.\left[\frac{1-(1+r)^{-n}}{r}\right]$.

Annuity Due Formulae (Beginning):

Future Value = $S = R.\left[\frac{(1+r)^{n+1} - 1}{r} - 1\right]$.

Present Value = $A = R.\left[1 + \frac{1-(1+r)^{-n+1}}{r}\right]$.

$^nP_r = \frac{n!}{(n-r)!}$; $\binom{n}{r} = {}^nC_r = \frac{n!}{r!(n-r)!}$.

$\#(A \cup B) = \#(A) + \#(B) - \#(A \cap B)$

Net present value (NPV) = (Sum of the present values of the cash flows) $-$ (The initial investment.)

If NPV > 0, then the investment is profitable; if NPV < 0, then the investment is not profitable.

1Q1. Optimal Land Use. A farmer has 1000 acres of land on which corn, wheat, or soybeans can be grown.

Each acre of corn costs \$ 100 for preparation, requires 7 days of labor, and yields a profit of \$ 30.

An acre of wheat costs \$ 120 to prepare, requires 10 days of labor, and yields \$ 40 profit.

An acre of soybeans costs \$ 70 to prepare, requires 8 days of labor, and yields \$ 40 profit.

Suppose that the farmer has \$ 10000 for preparation and can count on enough workers to supply 8000 days of labor.

Let $x_1,\ x_2$, and x_3 represent the acres of corn, wheat, and soybeans, respectively, planted.

Set up the standard maximum linear programing problem (without solution) to find the number of acres of land devoted to each crop to maximize profits?

(A) Maximize $P = 30x_1 + 40x_2 + 40x_3$
subject to the econstraints

$$\begin{cases} x_1 + x_2 + x_3 \leq 1000 \\ 100x_1 + 120x_2 + 70x_3 \leq 10000 \\ 7x_1 + 10x_2 + 8x_3 \leq 8000 \\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0 \end{cases}$$

(B) Maximize $P = 30x_1 + 40x_2 + 40x_3$
subject to the econstraints

$$\begin{cases} x_1 + x_2 + x_3 \geq 1000 \\ 100x_1 + 120x_2 + 70x_3 \geq 10000 \\ 7x_1 + 10x_2 + 8x_3 \geq 8000 \\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0 \end{cases}$$

==================================

(C) Maximize $P = 30x_1 + 40x_2 + 40x_3$
subject to the econstraints

$$\begin{cases} x_1 + x_2 + x_3 \leq 10000 \\ 100x_1 + 120x_2 + 70x_3 \leq 8000 \\ 7x_1 + 10x_2 + 8x_3 \leq 1000 \\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0 \end{cases}$$

(D) Maximize $P = 30x_1 + 40x_2 + 40x_3$
subject to the econstraints

$$\begin{cases} x_1 + x_2 + x_3 \leq 1000 \\ 70x_1 + 120x_2 + 100x_3 \leq 10000 \\ 8x_1 + 10x_2 + 7x_3 \leq 8000 \\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0 \end{cases}$$

==================================

(E) Maximize $P = 1000x_1 + 10000x_2 + 8000x_3$

subject to th econstraints

$$\begin{cases} x_1 + x_2 + x_3 \leq 30 \\ 100x_1 + 120x_2 + 70x_3 \leq 40 \\ 7x_1 + 10x_2 + 8x_3 \leq 40 \\ x_1 \geq 0,\ x_2 \geq 0,\ x_3 \geq 0 \end{cases}$$

2Q2. Write the DUAL of the Standard Minimum Linear Programing Problem

Minimize $Q = x + 2y + z$,

subject to the constraints:

$$\begin{array}{ccccccc} x & - & 3y & + & 4z & \geq & 12 \\ 3x & + & y & + & 2z & \geq & 10 \\ x & - & y & - & z & \geq & -8 \\ x & \geq & 0, & y & \geq 0, & z \geq & 0 \end{array}$$

in the Form of Standard Maximum Linear Programing Problem and then write the Initial Simplex Tableau of it.

$$(A).\begin{bmatrix} 1 & 3 & 1 & 1 & 0 & 0 & 0 & : & 1 \\ 3 & 1 & 1 & 0 & 1 & 0 & 0 & : & 2 \\ 4 & 2 & 1 & 0 & 0 & 1 & 0 & : & 1 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ -12 & -10 & 8 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix} \quad (B)\begin{bmatrix} 1 & 3 & 1 & 1 & 0 & 0 & 0 & : & 1 \\ -3 & 1 & -1 & 0 & 1 & 0 & 0 & : & 2 \\ 4 & 2 & -1 & 0 & 0 & 1 & 0 & : & 1 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ 12 & 10 & -8 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

=======================================

$$(C).\begin{bmatrix} 1 & 3 & 1 & 1 & 0 & 0 & 0 & : & 12 \\ -3 & 1 & -1 & 0 & 1 & 0 & 0 & : & 10 \\ 4 & 2 & -1 & 0 & 0 & 1 & 0 & : & 8 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ -1 & -2 & -1 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix} \quad (D)\begin{bmatrix} 1 & -3 & 4 & 1 & 0 & 0 & 0 & : & 1 \\ 3 & 1 & 2 & 0 & 1 & 0 & 0 & : & 2 \\ 1 & -1 & -1 & 0 & 0 & 1 & 0 & : & 1 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ 12 & 10 & -8 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

=======================================

$$(E).\begin{bmatrix} 1 & 3 & 1 & 1 & 0 & 0 & 0 & : & 1 \\ -3 & 1 & -1 & 0 & 1 & 0 & 0 & : & 2 \\ 4 & 2 & -1 & 0 & 0 & 1 & 0 & : & 1 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ -12 & -10 & 8 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

==

3Q3. Standard Maximum Linear Programing Problem

Maximize $P = 3x_1 + x_2$

subject to the constraints

$$\begin{cases} x_1 & + & x_2 & \leq & 2 \\ 2x_1 & + & 3x_2 & \leq & 12 \\ 3x_1 & + & x_2 & \leq & 12 \\ x_1 \geq & 0, & x_2 \geq & \geq & 0 \end{cases}$$

The initial tableau is

$$\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ s_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 2 & 3 & 0 & 1 & 0 & 0 & : & 12 \\ s_3 & 3 & 1 & 0 & 0 & 1 & 0 & : & 12 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & -3 & -1 & 0 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

The PIVOT element is $m_{11} = 1$ in the first row and first column.

Pivot on $m_{11} = 1$ to obtain the next final tableau.

$$(A)\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ x_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 0 & 1 & 2 & 1 & 0 & 0 & : & 8 \\ s_3 & 0 & 2 & 3 & 0 & 1 & 0 & : & 6 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & 0 & 2 & 3 & 0 & 0 & 1 & : & 6 \end{bmatrix} \qquad (B)\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ x_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 0 & -1 & 2 & 1 & 0 & 0 & : & 8 \\ s_3 & 0 & 2 & -3 & 0 & 1 & 0 & : & 6 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & 0 & 2 & 3 & 0 & 0 & 1 & : & 6 \end{bmatrix}$$

$$(C)\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ x_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 0 & 1 & -2 & 1 & 0 & 0 & : & 6 \\ s_3 & 0 & -2 & -3 & 0 & 1 & 0 & : & 8 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & 0 & 2 & 3 & 0 & 0 & 1 & : & 8 \end{bmatrix} \qquad (D)\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ x_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 0 & 1 & -2 & 1 & 0 & 0 & : & 12 \\ s_3 & 0 & -2 & -3 & 0 & 1 & 0 & : & 12 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & 0 & 2 & 3 & 0 & 0 & 1 & : & 16 \end{bmatrix}$$

$$(E)\begin{bmatrix} & x_1 & x_2 & s_1 & s_2 & s_3 & P & : & const \\ x_1 & 1 & 1 & 1 & 0 & 0 & 0 & : & 2 \\ s_2 & 0 & 1 & -2 & 1 & 0 & 0 & : & 8 \\ s_3 & 0 & -2 & -3 & 0 & 1 & 0 & : & 6 \\ .. & .. & .. & .. & .. & .. & .. & : & \cdots \\ P & 0 & 2 & 3 & 0 & 0 & 1 & : & 6 \end{bmatrix}$$

==

4Q4. Nutrition. A dietitian in a hospital is to arrange a special diet composed of three basic foods. The diet is to include exactly 340 units of calcium, 180 units of iron, and 220 units of vitamin A. The number of units per ounce of each special ingredient for each of the foods is indicated in the table.

	Units	per	Ounce
	Food A	Food B	Food C
Calcium	30	10	20
Iron	10	10	20
Vitamin A	10	30	20

Let x, y, and z be the number of ounces of Food A, Food B, and Food C, respectively.

Then the system of equations to find the number of ounces of Food A, Food B, and Food C, is given by:

$$(A) \longrightarrow \begin{cases} 30\,x + 10\,y + 20\,z = 220 \\ 10\,x + 10\,y + 20\,z = 340 \\ 10\,x + 30\,y + 20\,z = 180 \end{cases}$$

$$(B) \longrightarrow \begin{cases} 20\,x + 10\,y + 30\,z = 340 \\ 20\,x + 10\,y + 10\,z = 180 \\ 20\,x + 30\,y + 10\,z = 220 \end{cases}$$

$$(C) \longrightarrow \begin{cases} 10\,x + 30\,y + 20\,z = 340 \\ 10\,x + 10\,y + 20\,z = 180 \\ 30\,x + 10\,y + 20\,z = 220 \end{cases}$$

$$(D) \longrightarrow \begin{cases} 30\,x + 10\,y + 20\,z = 340 \\ 10\,x + 10\,y + 20\,z = 180 \\ 10\,x + 30\,y + 20\,z = 220 \end{cases}$$

$$(E) \longrightarrow \begin{cases} 30\,x + 10\,y + 10\,z = 340 \\ 10\,x + 10\,y + 30\,z = 180 \\ 20\,x + 20\,y + 20\,z = 220 \end{cases}$$

==

5Q5. Solving a System using Gauss-Jordan Elimination Method.

$$\begin{cases} 3\,x + 6\,y - 9\,z = 15 \\ 2\,x + 4\,y - 6\,z = 10 \\ 2\,x + 3\,y - 4\,z = 6 \end{cases}$$

The augmented matrix of the above system of equations is given by

$$\left[\begin{array}{ccc|c} 3 & 6 & -9 & 15 \\ 2 & 4 & -6 & 10 \\ 2 & 3 & -4 & 6 \end{array}\right].$$

By using Elementary Row Operations we obtain the following matrix in reduced form.

$$(A) \longrightarrow \left[\begin{array}{ccc|c} 1 & 0 & 1 & -3 \\ 0 & 1 & -2 & 4 \\ 0 & 0 & 1 & 0 \end{array}\right]$$

$$(B) \longrightarrow \left[\begin{array}{ccc|c} 1 & 0 & 1 & -3 \\ 0 & 1 & -2 & 4 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$(C) \longrightarrow \left[\begin{array}{ccc|c} 1 & 0 & 1 & 3 \\ 0 & 1 & 2 & 4 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$(D) \longrightarrow \left[\begin{array}{ccc|c} 1 & 0 & 1 & -3 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 0 & 0 \end{array}\right]$$

$$(E) \longrightarrow \left[\begin{array}{ccc|c} 1 & 0 & 1 & 1 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & 0 \end{array}\right]$$

==

6Q6. Let m be the number of different license plates. If each contains 3 letters (out of the alphabet's 26 letters) followed by 3 digits (from 0 to 9).

Let n be the number of different license plates of these license plates which contain no repeated letters and no repeated digits.

Then $m - n$ is equal to:

$A \longrightarrow 17576000$

$B \longrightarrow 11232000$

$C \longrightarrow 6344000$

$D \longrightarrow 1422700$

$E \longrightarrow 3172000$

==

7Q7. A group of 1000 people touring Europe includes 420 people who speak French, 550 who speak German, and 170 who speak neither Germen nor French languages.

The number of people in the group who speak both French and German are

$A \longrightarrow 30$

$B \longrightarrow 140$

$C \longrightarrow 800$

$D \longrightarrow 130$

$E \longrightarrow 420$

==

8Q8. Suppose that 6 female and 5 male applicants have been successfully screened for 5 positions. In how many ways can at least (minimum) 4 females be selected?

$A \longrightarrow 3600$

$B \longrightarrow 720$

$C \longrightarrow 462$

$D \longrightarrow 450$

$E \longrightarrow 81$

==

9Q9. In how many ways can the eleven letters in the word MISSISSIPPI be arranged?

$A \longrightarrow 39916800$

$B \longrightarrow 371712$

$C \longrightarrow 382206000$

$D \longrightarrow 34650$

$E \longrightarrow 4710330000$

==

10Q10. A restaurant offers 6 different salads, 5 different main courses, 10 different desserts, and 4 different drinks.

How many different lunches – each consisting of a salad, a main course, a dessert, and a drink – are possible?

$A \longrightarrow 25$

$B \longrightarrow 1200$

$C \longrightarrow 5544$

$D \longrightarrow 303600$

$E \longrightarrow 5225470000$

==

11Q11. An annuity consisting of equal payments at the end of each quarter for three years is to be purchased now for \$ 7089.88.

If the interest rate is 6 % compounded quarterly, how much is each payment?

$A \longrightarrow \$ 500$

$B \longrightarrow \$ 550$

$C \longrightarrow \$ 600$

$D \longrightarrow \$ 650$

$E \longrightarrow \$ 700$

==

12Q12. At the beginning of each quarter, \$ 500 is deposited into a savings account that pays 6%

compounded quarterly.

Find the balance at the end of three years.

$A \longrightarrow$ \$ 6618.41

$B \longrightarrow$ \$ 6520.61

$C \longrightarrow$ \$ 6485.95

$D \longrightarrow$ \$ 6956.50

$E \longrightarrow$ \$ 6234.57

==

13Q13. A trust fund is being set up by a single payment so that at the end of 20 years there will be \$ 20000 in the fund.

If interest is compounded continuously at an annual rate of 7 %, how much money should be paid into the fund initially?

$A \longrightarrow$ \$ 4931.94

$B \longrightarrow$ \$ 5168.38

$C \longrightarrow$ \$ 4992.02

$D \longrightarrow$ \$ 4952.04

$E \longrightarrow$ \$ 4280.00

==

14Q14. A newborn child receives a \$ 20000 gift toward colege education from her grandparents.

How much will the \$ 20000 be worth in 17 years if it is invested at 7 % compounded quarterly?

$A \longrightarrow$ \$ 63176.35

$B \longrightarrow$ \$ 95208.32

$C \longrightarrow$ \$ 91163.26

$D \longrightarrow$ \$ 65068.44

$E \longrightarrow$ \$ 75206.88

==

15Q15. In a suburb, housing costs have been increasing at 5.2 % per year compounded annually for the past 8 years.

A house worth \$ 260000 now would have had what value 8 years ago?

$A \longrightarrow$ \$ 135206.60

$B \longrightarrow$ \$ 173319.50

$C \longrightarrow$ \$ 142268.50

$D \longrightarrow$ \$ 156795.75

$E \longrightarrow$ \$ 149626.80

==

16Q16. Investment. If \$ 12345.60 is invested at an annual rate of 3 % compounded continuously, find the compound amount at the end of 10 years.

$A \longrightarrow$ \$ 16591.45

$B \longrightarrow$ \$ 16454.60

$C \longrightarrow$ \$ 16664.82

$D \longrightarrow$ \$ 17164.75

$E \longrightarrow$ \$ 17679.78

==

17Q17. Cash Flows. An initial investment of \$ 25000 in a business guarantees the following cash flows:

Year	*Cash Flow*
3	\$ 8000.00
4	\$ 10000.00
6	\$ 14000.00

Assume an interest rate of 6 % compounded semiannually.

Find the net present value (NPV) of the cash flows and determine whether the investment is profitable.

$A \longrightarrow$ − \$ 586.72 *and investment is not profitable.*

$B \longrightarrow$ − \$ 685.27 *and investment is not profitable.*

$C \longrightarrow$ \$ 725.86 *and investment is profitable.*

$D \longrightarrow$ − \$ 550.00 *and investment is not profitable.*

$E \longrightarrow$ \$ 515.62 *and investment is profitable.*

==

18Q18. (Cookie Orders). A cookie company makes three kinds of cookies - oatmeal raisin, chocolate chip, and shortbread - packaged in small, medium, and large boxes.

The small box contains 1 dozen oatmeal raisin and 1 dozen chocolate chip, and 1 dozen shortbread;

the medium box has 2 dozen oatmeal raisin, 1 dozen chocolate chip, and 1 dozen shortbread;

the large box contains 2 dozen oatmeal raisin, 2 dozen chocolate chip, and 3 dozen shortbread.

If you require exactly 15 dozen oatmeal raisin, 10 dozen chocolate chip, and 11 dozen shortbread cookies, how many boxes of each size should you buy?

Let $x =$ number of small boxes,

let $y =$number of medium boxes, and

let $z =$ number of large boxes.

Set up the system of equations without solution.

$$(A).\begin{cases} x + 2y + 2z = 10 \\ x + y + 2z = 15 \\ x + y + 3z = 11 \end{cases}$$

==============================

$$(B).\begin{cases} x + y + 2z = 15 \\ x + 2y + 2z = 10 \\ x + y + 3z = 11 \end{cases}$$

==============================

$$(C).\begin{cases} x + 2y + 2z = 15 \\ x + y + 2z = 10 \\ x + y + 3z = 11 \end{cases}$$

==============================

$$(D).\begin{cases} x + 2y + 2z = 15 \\ x + y + 2z = 10 \\ 3x + y + z = 11 \end{cases}$$

==============================

$$(E).\begin{cases} x + 2y + 2z = 15 \\ x + 2y + z = 10 \\ x + y + 3z = 11 \end{cases}$$

==

19Q19. (Mixture Problem). Minimize the cost of preparing the following mixture, which is made up of three foods, I, II, III.

Food I costs \$ 2 per unit, food II costs \$ 1 per unit, and food III costs \$ 3 per unit.

Each unit of food I contains 2 ounces of protein and 4 ounces of carbohydrate;

Each unit of food II contains 3 ounces of protein and 2 ounces of carbohydrate;

and each unit of food III has 4 ounces of protein and 2 ounces of carbohydrate.

The mixture must contain at least 20 ounces of protein and 15 ounces of carbohydrate.

Let x, y, z represent the number of units of foods I, II, III, respectively.

Then the constraint in terms of the system of linear inequalities in order to minimize the cost $C = 2x + y + 3z$, is given by:

$$(A).\begin{cases} 2x + 3y + 4z \leq 20 \\ 4x + 2y + 2z \geq 15 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==================================

$$(B).\begin{cases} 2x + 3y + 4z \geq 20 \\ 4x + 2y + 2z \leq 15 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==================================

$$(C).\begin{cases} 2x + 3y + 4z \leq 20 \\ 4x + 2y + 2z \leq 15 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==================================

$$(D).\begin{cases} 3x + 2y + 4z \geq 15 \\ 4x + 2y + 2z \geq 20 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==================================

$$(E).\begin{cases} 2x + 3y + 4z \geq 20 \\ 4x + 2y + 2z \geq 15 \\ x \geq 0, \quad y \geq 0, \quad z \geq 0 \end{cases}$$

==

20Q20. Use the Simplex Method to solve the standard linear programing problem.

Maximize: $Z = 40x_1 + 60x_2 + 50x_3$,

subject to the constraints:

$$\begin{cases} 2x_1 + 2x_2 + x_3 \leq 8 \\ x_1 - 4x_2 + 3x_3 \leq 12 \\ x_1 \geq 0, \quad x_2 \geq 0, \quad x_3 \geq 0 \end{cases}$$

Initial Simplex Tableau:

$$\begin{bmatrix} 2 & 2 & 1 & 1 & 0 & 0 & : & 8 \\ 1 & -4 & 3 & 0 & 1 & 0 & : & 12 \\ .. & .. & .. & .. & .. & .. & : & \cdots \\ -40 & -60 & -50 & 0 & 0 & 1 & : & 0 \end{bmatrix}$$

The Maximum Value of $Z =$

$A \longrightarrow$ 30000

$B \longrightarrow$ 20

$C \longrightarrow$ 240

$D \longrightarrow$ 352

$E \longrightarrow$ 35000

==

21Q21. A debt of \$5000 due five years from now and \$ 5000 due ten years from now is to be repaid by a payment of \$ 2000 in two years, a payment of \$ 4000 in four years, and a final payment at the end of six years.

If the interest rate is 3 % compounded annually, then the final payment is in the interval:

$A \longrightarrow$ (3000.00, 3050.00)

$B \longrightarrow$ (3050.00, 3150.00)

$C \longrightarrow$ (3150.00, 3250.00)

$D \longrightarrow$ (3250.00, 3400.00)

$E \longrightarrow$ (3400.00, 3500.00)

==

Qn#	A	B	C	D	E	Marks
1	√					A
2					√	E
3					√	E
4				√		D
5		√				B
6			√			C
7		√				B
8					√	E
9				√		D
10		√				B
11				√		D
12	√					A
13	√					A
14				√		D
15		√				B
16			√			C
17	√					A
18			√			C
19					√	E
20				√		D
21		√				B
Sum						126