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FINAL EXAMINATION

COURSE NAME	:	**BUSINESS MATHEMATICS**
COURSE CODE	:	**MAT1013**
EXAMINATION	:	**DECEMBER 2022**
DURATION	:	**3 HOURS**

INSTRUCTION TO CANDIDATES

1. This question paper consists of **TWO (2)** parts :   PART A (30 Marks)

    PART B (20 Marks)

2. Candidates are not allowed to bring any material to the examination room except with the permission from the invigilator.

3. Please check to make sure that this examination pack consist of:
   i. The Question Paper
   ii. An Answering Booklet

PART A

This part consist of **TEN (10)** questions.

Answer ALL questions in Answering Booklet.

QUESTION 1

Given an arithmetic sequence $15, 10, 5, \ldots, -130$. Find the sum of all terms in this sequence.

(3 marks)

QUESTION 2

RM850 is invested on 15 January 2021 at a simple interest rate of r% per annum. The amount on 8 September 2021 using Banker Rule's is RM901.56. Find the value of r.

(3 marks)

QUESTION 3

If Amir needs RM4,000 now, how much should he borrow from a bank for 9 months at a 11% bank discount rate? What is the discount that bank gives to Amir?

(3 marks)

QUESTION 4

On Amin's sixth birthday, his father deposited RM3,500 in an account that earned 5% interest compounded quarterly. What would be the amount on his 20th birthday? What is the total interest earned?

(3 marks)

QUESTION 5

RM250 is deposited every month for 3 years 7 months at 5.4% compounded monthly. What is the amount and interest earned at the end of 3 years 7 months?

(3 marks)

QUESTION 6

Shila bought a television listed at RM2,500 cash through an instalment plan. She paid RM100 as a down payment. The balance was settled by making 10 monthly instalment. If the interest rate charged was 7% per annum on the original balance, find the instalment price and the monthly payment of the television.

(3 marks)

QUESTION 7

The net price of a computer listed as RM3,989 after deducting trade discount of 10%, 5% and x% is RM3,303.16. Find;

a)   the value of x.

(2 marks)

b)   the single discount that is equivalent to the trade discount given.

(1 mark)

QUESTION 8

A dealer purchased 30 dresses for RM5,100. She wants a net profit of 30% based on selling price. If the operating expenses are 15% based on the cost price, find the selling price of each dress.

(3 marks)

QUESTION 9

A machine was bought for RM70,000. It is estimated to have a useful life of tenth years with a salvage value of RM8,000. Using the sum of year digit method, find the book value of the machine at the end of sixth years.

(3 marks)

QUESTION 10

The marginal cost, $C'(x)$ for a certain product is given as $C'(x) = 50 - 0.08x$ where x is the level of output. Find;

(a)   the total cost function if fixed costs are RM5,000.

(2 marks)

(b)   the cost to produce 300 units products.

(1 mark)

[30 MARKS]

PART B

This part consist of **FOUR (4)** questions.

Answer ALL questions in Answering Booklet.

QUESTION 1

Anas borrowed a sum of money from a bank on 7 February 2020. The bank charged an interest rate of 4.5% per annum. After 270 days, Anas has to pay RM4,329.55 to settle the loan. By using the exact time and exact simple interest, find:

a)   the date of repayment the loan.

(2 marks)

b)   the amount borrowed by Anas.

(2 marks)

c)   the interest charged by the bank to Anas.

(1 mark)

QUESTION 2

Anees received a 100 days note with an interest rate of 7.3% per annum. The face value of the note is RM2,400 and the maturity date is 23 July 2021. She discount the note at 6% discount rate, 60 days after received the note. Find:

a)   the date of the note.

(2 marks)

b)   the proceed received.

(3 marks)

QUESTION 3

Amira purchased a RM4,000 washing machine through an instalment plan. She has to pay 15% down payment and 20 monthly payment of RM210 each. Find:

a)   the instalment price.

(2 marks)

b)   the interest charge.

(1 mark)

c)   the outstanding balance immediately after the 14th payment, using Rule of 78.

(2 marks)

QUESTION 4

A machine was bought at the price of RM80,500. The expected life of the machine is 12 years. If the scrap value of the machine is RM9,500, find:

a)   the book value at the end of 4 years using straight line method.

(2 marks)

b)   the book value at the end of 8 years using declining balance method.

(3 marks)

[20 MARKS]

END OF QUESTION PAPER

APPENDIX
LIST OF FORMULA

Arithmetic Sequence
$T_n = a + (n - 1)(d)$ $S_n = \dfrac{n}{2}[2a + (n - 1)(d)]$
Geometric Sequence
$T_n = ar^{n-1}$ $S_n = \dfrac{a(r^n - 1)}{r - 1}, r > 1$ $S_n = \dfrac{a(1 - r^n)}{1 - r}, r < 1$
Simple Interest   **Future Value:** $I = Prt$ $S = P(1 + rt)$ **Present Value:** $P = S(1 + rt)^{-1}$
Promissory Note $D = Sdt$ $Pro = S(1 - dt)$ $r = \dfrac{d}{1 - dt}$ $d = \dfrac{r}{1 + rt}$
Compound Interest / Faedah Kompaun   **Future Value:** $S = P(1 + i)^n$ **Present Value:** $P = S(1 + i)^{-n}$ **Equivalent Rate:** $1 + r = \left(1 + \dfrac{k}{m}\right)^m$ $\left(1 + \dfrac{k}{m}\right)^m = \left(1 + \dfrac{K}{M}\right)^M$

Annuity

$$S = R\left[\frac{(1+i)^n - 1}{i}\right]$$

$$A = R\left[\frac{1-(1+i)^{-n}}{i}\right]$$

Installment Purchase

$Instalment\ Price = Down\ Payment + Total\ Monthly\ Payment$

Or

$Instalment\ Price = Cash\ Price + Total\ Interest$

$$r = \frac{2mI}{B(n+1)}$$

$$B = RN - I\left[\frac{N(N+1)}{n(n+1)}\right]$$

Annuity Method

$$A = R\left[\frac{1-(1+i)^{-n}}{i}\right]$$

$$R = \frac{Ai}{1-(1+i)^{-n}}$$

Trade And Cash Discount

$NP = L(1-r)$

$NP = L(1-r_1)(1-r_2)(1-r_3)(1-r_4)$

$sde = 1 - (1-r_1)(1-r_2)(1-r_3)(1-r_4)$

Mark-Up And Mark Down

$MD = OP - NP$

$$\%MD = \frac{MD}{OP} \times 100$$

$R = C + NP + OE$

$BEP = C + OE$

Depreciation

$BV = C - D_a$

$$r = 1 - \sqrt[UL]{\left(\frac{SV}{C}\right)}$$

$BV = C(1-r)^n$

$D_a = C - C(1-r)^n$

$$S = \frac{UL(UL+1)}{2}$$

Calculus

Differentiation

$f(x) = c, f'(x) = 0$

$f(x) = mx, f'(x) = m$

$f(x) = x^n, f'(x) = nx^{n-1}$

Integration

$$\int k\,dx = kx + c$$

$$\int x^n\,dx = \frac{x^{n+1}}{n+1} + c$$