en kamarul

UNIVERSITI TEKNOLOGI MARA
TEST 1

COURSE	:	**BUSINESS MATHEMATICS**
COURSE CODE	:	**MAT 112**
EXAMINATION	:	**NOV 2019**
TIME	:	**1 HOUR 15 MINUTES**

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of three (3) questions.
2. Answer ALL questions. Start each answer on a new page.
3. Do not bring any material into the examination room unless permission is given by the invigilator.
4. Answer ALL question in English.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

QUESTION 1

a) A loan was paid RM 5,902.50 after 5 years and 6 months borrowed. If the interest was charge simple interest of 5.5%. Find the amount of the loan and interest charged.

(5 marks)

b) On 11th January 2016, Zafran deposited RM 7,000 in an account that offered ***r%*** simple interest per annum. If the interest earned on 16th April 2016 was RM 67.25, by using *Banker's Rule*, find the value of ***r***.

(5 marks)

QUESTION 2

a) Evian needed RM ***X*** now to startup his business and is considering to take a loan from JKL Bank. The bank charged him a 9.5% bank discount rate for loan term of 3 years and 7 months. Find ***X*** if his borrowed amount is RM75,805.44.

(5 marks)

b) Suraya received a 180 days promissory note on 12 May 2019 with simple interest rate of 7% per annum. After 60 days, she discounted the note at a discount rate of 5% and received proceeds of RM 14 750. Find

i. the maturity date

(2 marks)

ii. the maturity value

(3 marks)

iii. the face value

(3 marks)

iv. the simple interest rate that is equivalent to the discount rate

(2 marks)

QUESTION 3

a) You plan to have a sum of money in the next twenty years. By saving RM300 every two months, you can earn 12% compounded every two months on the investment. If you are 20 years old today, how much will you have in your account in the future? Calculate the interest gained

(5 marks)

b) Mark took a loan to buy a studio room for RM175, 000. He made a 10% down payment and the balance was financed through a bank for 20 years. The bank charged the interest rate was 6% compounded monthly. Find

i) The monthly payment.

(4 marks)

ii) If Mark fails to pay for the first five monthly payments, how much should he pay on the sixth payment to settle all the outstanding arrears?

(3 marks)

iii) The outstanding balance if Mark decides to settle the loan immediately after the 15 years payment.

(3 marks)

END OF QUESTION PAPER

LIST OF FORMULA

1. $S = P(1+rt)$	**2.** $\text{Proceeds} = S(1-dt)$
3. $r = \dfrac{d}{1-dt}$	**4.** $d = \dfrac{r}{1+rt}$
5. $S = P(1+i)^n$	**6.** $S = R\left(\dfrac{(1+i)^n - 1}{i}\right)$
7. $A = R\left(\dfrac{1-(1+i)^{-n}}{i}\right)$	

Answers

Question 1a

a) S = RM5,902.50

$t = 5\frac{6}{12}$ @ 5.5

r = 0.055

P=?, I=?

S = P(1+rt) ✓

5,902.50 = P(1 + 0.055 x 5.5)

5,902.50 = P(1.3025)

RM 4,531.67 = P ✓✓

S = P + I ✓

5,902.50 = 4,531.67 + I

RM 1,370.83 = I ✓

Question 1b

b)

11/1/2016	r%	16/4/2016
P = 7,000		I = 67.25

t = ?

11/1 – 31/1 = 20

2 = 29 ✓

3 = 31

16/4 = 16 ✓

96 days ✓✓

$I = Prt$

$67.25 = 7{,}000 \times r \times \frac{96}{360}$

$67.25 = 1866\frac{2}{3}r$

$0.036026785 \times 100 = r$

$3.603\% = r$

Question 2a

$$\text{Proceeds} = S(1 - dt)$$
$$= 75\,805.44\left[1 - 0.095\left(3\tfrac{7}{12}\right)\right]$$
$$= 50\,000.00$$

Question 2b

i. the maturity date (2 marks)

12 May 2019 = 31-12 = 19
June 2019 = 30
July 2019 = 31
August 2019 = 31
September 2019 = 30
October 2019 = 31
8 November 2019 = 8, Total = 180 days Answer: 8 November 2019

ii. the maturity value (3 marks)

Proceeds = S (1-dt)
S = Proceeds / (1- dt)
S = 14750 / (1- (0.05)(120/360))
S = RM 15000

iii. the face value (3 marks)

S = P (1 + rt)
P = S / (1+rt)
P = 15000 / (1 + (0.07)(180/360))
P = RM 14492.75

iv. the simple interest rate that is equivalent to the discount rate (2 marks)

r = d / (1-dt)
r = (0.05) / (1- (0.05)(120/360))
r = 0. 0508 or 5.08%

Question 3a

$$S = 300\left[\frac{\left(1+\frac{0.12}{6}\right)^{120}-1}{\frac{0.12}{6}}\right]$$

$$S = 146\,477.45$$

$$\text{Interest} = S - R_n = 146\,477.45 - 36\,000 = 110\,477.45$$

Question 3b

Cost = 175,000

DP = 10% × 175,000 = 17,500

a) Bal = Cost - DP

= 175,000 - 17,500

= 157,500

$i = \frac{k}{m}$ $n = mt$

$= \frac{0.06}{12} = 0.005$ $= 12(20) = 240$

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

$157{,}500 = R\left[\frac{1-(1+0.005)^{-240}}{0.005}\right]$ (4)

$RM1{,}128.38 = R$

b) $n = 6$,

$S = R\left[\frac{(1+i)^n - 1}{i}\right]$ (3)

$= 1128.38\left[\frac{(1+0.005)^6 - 1}{0.005}\right]$

$= RM6{,}855.47$

c) n = (20 - 15) × 12

= 60

$A = R\left[\frac{1-(1+i)^{-n}}{i}\right]$ (3)

$= 1128.38\left[\frac{1-(1+0.005)^{-60}}{0.005}\right]$

$= RM58{,}883.34$