



<div> <b>KEMENTERI/ PENDIDIKAN MALAYSIA</b></div> <div></div> <div><b>JABATAN MATEMATIK, SAINS DAN KOMPUTER</b></div>		COURSE CODE/ COURSE NAME		DBM2033 DISCRETE MATHEMATICS	
		COURSEWORK ASSESSMENT		QUIZ 3	
		SESSION		DECEMBER 2018	
		DURATION	15 MINS	CLO1	10 MARKS
CLO2					
CLO3					
NAME					
REGISTRATION NO.					
PROGRAMME/ SECTION		TOTAL MARKS		10 MARKS	

### Instructions

- Answer ALL questions. Write your answers in the spaces provided.
- Show your working to get marks. You may use a non-programmable scientific calculator.

### Question 1

CLO2, C3

[6 marks]

Let  $P(n)$  is the statement of  $1 + 4 + 7 + 10 + \dots + (3n - 2) = \frac{n(3n-1)}{2}$ , where  $n$  is all positive integer.

(a) Show that  $P(1)$  is true.

$$P(1): 3(1) - 2 = \frac{1(3(1) - 1)}{2}$$

$$1 = 1$$

Since both sides are same, then  $P(1)$  is true.

Complete and correct answer will be given 3 marks.

(b) Complete the inductive step.

$$3k - 2 + 3(k + 1) - 2$$

$$= \frac{k(3k - 1)}{2} + 3(k + 1) - 2$$

$$= \frac{k(3k-1)}{2} + \frac{6(k+1)-4}{2}$$

$$= \frac{3k^2+5k+2}{2}$$

$$= \frac{(3k+2)(k+1)}{2}$$

Complete and correct answer will be given 3 marks.

### Question 2

CLO2, C2

[4 marks]

Suppose  $f$  is recursively defined by  $f(0) = 1$  and  $f(n + 1) = \frac{2}{f(n)} + 3f(n)$ .

Count  $f(4)$ .

$$f(1) = f(0 + 1) = \frac{2}{f(0)} + 3f(0) = \frac{2}{1} + 3 = 5$$

$$f(2) = f(1 + 1) = \frac{2}{5} + 3(5) = \frac{2}{5} + 15 = \frac{77}{5} = 15.4$$

$$f(3) = f(2 + 1) = \frac{2}{77/5} + 3\left(\frac{77}{5}\right) = 46.3$$

$$f(4) = f(3 + 1) = \frac{2}{46.3} + 3(46.3) = 139.02$$