



## Applied Mathematics for Biomedical Technology

BMT (222)

Time: 120 Minutes

<p style="text-align: center;"><b><u>King Saud University</u></b></p> <p style="text-align: center;"><b><u>College of Applied Medical Sciences</u></b></p> <p style="text-align: center;"><b><u>Biomedical Technology Department</u></b></p> <p style="text-align: center;"><b><u>First Midterm</u></b></p> <p style="text-align: center;"><b><u>Course Instructor: Dr. Widad Babiker</u></b></p> <p style="text-align: center;"><b><u>Course No. 222, First Semester 1442-1442</u></b></p> <p style="text-align: center;"><b><u>Date Time: Tuesday 20/10/2020</u></b></p> <p style="text-align: center;"><b><u>الموافق 3/3/1442</u></b></p>
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Student's Name	
Student's ID	

Question No.	Q <sub>1</sub>	Q <sub>2</sub>	Q <sub>3</sub>	Q <sub>4</sub>	Total
Maximum Marks					
Obtained Marks					

**Question 1**

i) Express the quotient in simplest form:  $\frac{9x^2 - 16}{3x^2 + 17x - 28} \div \frac{3x^2 - 2x - 8}{x^2 + 5x - 14}$  (write all details)

ii) Solve the given equation for  $x$ :  $\frac{-2}{x} + \frac{1}{x+2} = \frac{2}{3}$  (all details are needed)

iii) Find the partial fraction decomposition of  $\frac{3x^3 + x^2 + 4x + 8}{x^2(x^2 + 4)}$  (write all details)

**Question 2**

i) Simplify the complex fraction  $\frac{\frac{x^2}{y} - \frac{y^2}{x}}{\frac{x}{y} + 1 + \frac{y}{x}}$  (all details are needed)

ii) By using Cramer's rule to solve following systems of equations find the value of  $x$  (all details are needed)

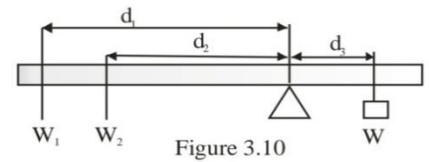
$$\frac{1}{x} - \frac{1}{y} + \frac{1}{z} = 0$$

$$\frac{1}{x} + \frac{2}{y} = 10$$

$$-\frac{3}{x} + \frac{1}{z} = 13$$

### Question 3

- i) A weight of 2.0 N and a lever are to be used to determine two other weights (see the figure below). A balance is obtained if  $d_1 = 2.0\text{m}$ ,  $d_2 = 2.0\text{m}$  and  $d_3 = 3.5\text{m}$  and if  $d_1 = 3.0\text{m}$ ,  $d_2 = 1.0\text{m}$  and  $d_3 = 2.0\text{m}$ . Determine the weights  $w_1$  and  $w_2$  (write all details)



- ii) Solve the equation by completing the square: A box with a rectangular base its width is 4ft shorter than its length and height 3 with volume  $36\text{ in}^3$ . Find the length and width (write all details)

**Question 4**

i) In  $\Delta ABC$  :  $BC = 10$  in, angle  $BAC = 50^\circ$ , and angle  $ACB = 30^\circ$ , find  $AB$ .

ii) Two forces of  $55.0$  lb. and  $37.0$  lb. respectively, are acting on the same object. If the angle between their directions is  $23.4^\circ$ , what single force would produce the same effect?