Applied Mathematics for Biomedical Technology

BMT (222) **Time: 90 Minutes**

King Saud University

College of Applied Medical Sciences

Biomedical Technology Department

First Midterm

Course Instructor: Dr. Widad Babiker

Course No. 222, first Semester 1440-1441

Date Time: Tuseday **1441/2/23ه**

الموافق 2019/10/22 م

Student's Name	
Student's ID	

Question No.	Q_1	Q_2	Q_3	Q_4	Total
Maximum Marks					

Question I

i. Solve the equation by completing the square: $2x^2 + 6x - \frac{7}{2} = 0$ (all details are needed)

ii. Two resistors when connected in series have a total resistance of 40 Ω when connected in parallel their total resistance is 8.4 Ω. If one of the resistors has a resistance of R_x Ω. (write all details)

a. Show that $R_x^2 - 40\mathrm{R_x} + 336 = 0$

b. Calculate the resistance of each.

Question 2

i. In figure below the moment of weight W is 5. The lever balances when $d_1 = 3m$ and $d_{2=}2m$ and when $d_1 = 6m$ and $d_{2=}3m$. Determine the weights W_1 and W_2(write all details)

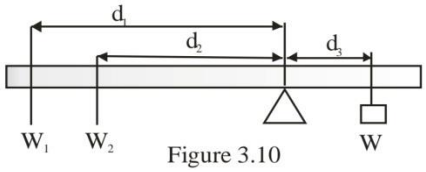
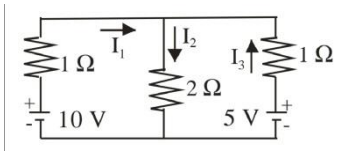


Figure 3.10

ii. Resolve $\frac{3 + 6x + 4x^2 - 2x^3}{x^2\,(x^2 + 3)}$ into partial fractions (all details are needed)

Question 3

i. Find the currents of the circuits by solving the system of equations given (write all details)



$$I_1 - I_2 + I_3 = 0$$
$$I_1 + 2I_2 = 10$$
$$-2I_1 - I_3 = -5$$

ii. Simplify the complex fraction $\dfrac{\dfrac{2}{x-2} + \dfrac{1}{x}}{\dfrac{3x-2}{x-5}}$ (all details are needed)

Question 4

i. Solve the following systems of equations by using Cramer rule (all details are needed)

$$2x - 3y + z = 1$$
$$x - 2y - 3z = 1$$
$$2x - z = 2$$

ii. Solve the given equation for x: $\frac{1}{x} - \frac{1}{x-4} = \frac{1}{3}$ (all details are needed)