



ALLAMA IQBAL OPEN UNIVERSITY
Semester Terminal Exam Autumn 2020

Program /level:	BS/ADC/Graduation	Maximum Marks	100
Title /Course Code	Applied Mathematics for Business & Social Sciences (5405)	Pass marks	50

Instructions for Exams:

1. Attempt All Questions.
2. Write answers in your own words and avoid copying from an internet source or any book.
3. Be precise, avoid unnecessary details, answer to each question must be between 600-800 words.
4. Students are advised to upload their answer sheets/solutions on LMS portal as soon as they complete their answers and not to wait for 8:30 PM.
5. Submissions after due date & time will not be entertained. Attach undertaking with each course code which were allowed to attempt in Urdu.
6. If plagiarism found, Student may be declared fail.

Q. No.	Questions	Marks
1	<p>(a) In a survey of 410 salespersons and 350 construction workers, it is found that 164 of the salespersons and 196 of the construction workers were overweight. If a person is selected at random from the group, what is the probability that:</p> <ol style="list-style-type: none">i. This person is overweight?ii. This person is a salesperson, given that the person is overweight?iii. This person is overweight, given that the person is a salesperson?iv. This person is a construction worker, given that the person is not overweight?v. This person is not overweight, given that the person is a construction worker? <p>(b) Sketch the plane representing $0x + y + 4z = 4$</p> <p>(c) Solve:</p> <p style="text-align: center;">i) $x - 12 = 4 - x$</p>	15+08+10=33
2	<p>(a) Suppose that the demand and price for a certain brand of shampoo are related by</p> $p = 16 - \frac{5}{4}q$ <p>Where p is price in dollars and q is demand.</p> <ol style="list-style-type: none">i) Find the price for a demand of: 0 units ; 8 unitsii) Find the demand for the shampoo at a price of : \$6, \$11, \$16	28+05=33

	<p>iii) Graph: $p = 16 - \left(\frac{5}{4}\right)q$</p> <p>Suppose the price and supply of the shampoo are related by</p> $p = \frac{3}{4}q$ <p>Where q represents the supply, and p the price.</p> <p>iv) Find the supply when the price is : \$0, \$10, \$20</p> <p>v) Graph $p = \frac{3}{4}q$ on the same axes used for part (iii)</p> <p>vi) Find the equilibrium supply</p> <p>vii) Find the equilibrium price.</p> <p>(b) Solve the following simultaneous linear equations by graphical method</p> $2x + 3y = 8$ $x + 4y = 9$	
3	<p>(a) Determine the location of all critical points and determine their nature for the function.</p> <p>(i) $f(x) = \ln(x^2 + 1) - x$</p> <p>(b) The annual profit for a firm depends upon the number of units produced. Specifically, the function which describes the relationship between profit P (Stated in dollars) and the number of units produced x is</p> $P = -0.01x^2 + 5,000x - 25,000$ <p>(i) Determine the number of units x which will result in maximum profit.</p> <p>(ii) What is the expected maximum profit?</p> <p>(c) Let $A = \begin{bmatrix} 1 & -2 \\ 4 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -1 \\ 0 & 5 \end{bmatrix}$. Find a matrix X satisfying the given equation.</p> <p>i) $2X = 2A + 3B$ ii) $3X = A - 3B$</p>	12+15+07=34