May/June 2018
Suggested Solutions

Section A

1.1 Market demand curve $= D_1 + D_2 + D_3 + \cdots$

Therefore Jones' aggregate family demand for sports bag:

$AD = (100 - 2P) + (5 - 5P) + (300) + \left(150 - \frac{1}{2}P\right) + (0)$

$AD = 100 - 2P + 5 - 5P + 300 + 150 - 0.5P + 0$

$AD = 555 - 7.5P$

1.2

Individual demand curve	**market demand curve**
Curve relating the quantity of a good that a single consumer will buy to its price.	Curve relating the quantity of a good that all consumers in a market will buy to its price.

The market demand curve flatter as compared to individual demand curves, therefore market demand curve is more elastic as compared to individual demand curve.

Refer to figure: 4.10 in textbook in chapter 4

1.3 **Movement along the demand curve:** is as a result of a change in price of the commodity and is referred to as change in quantity demanded

Shift of the demand curve: is as a result of change in other determinants of demand such as income and price of other commodities namely substitues or complements. The shift of demand curve is usually referred to as change in demand

1.4 Consider two goods, X and Y The price of product X increases from R6 to R8 per unit As a result, the quantity demanded of product Y decreases from 200 to 190 units

1.4.1 $\boldsymbol{Arc\ elasticity\ general\ formula} = \frac{\boldsymbol{\Delta quantity}}{\boldsymbol{\Delta determinant}} \times \frac{\boldsymbol{Average\ determinant}}{\boldsymbol{Average\ quantity}}$

$\boldsymbol{Arc\ cross-price\ elasticity} = \frac{\mathbf{190-200}}{\mathbf{8-6}} \times \frac{\mathbf{[8+6]\div 2}}{\mathbf{[190+200]\div 2}} = \mathbf{-0.18\ (3\ d.p)}$

1.4.2 **Complement goods**

2.1 2 1 The Department of Agriculture is interested in analysing the domestic market for maize The staff economists of the Department of Agriculture estimate the following equations for the demand and supply curves

$Q_d = 1600 - 125P$

$Q_s = 400 + 165P$

2.1.1 $1600 - 125P = 400 + 165P$

$1600 - 400 = 165P + 125P$

$1200 = 290P$

$\frac{1200}{290} = P$

$P = R4.14$

2.1.2 Substitute price into any of the two equations:

$Q_d = 1600 - 125(4.14) = 1083\ units$

$Q_s = 400 + 165(4.14) = 1083$ units

2.2 Consider the market for wheat Using the standard rule of demand and supply, explain how the equilibrium price and quantity would change in each of the following situations, *ceteris paribus*

2.2.1 Demand curve for bread will shift to the left and downwards, equilibrium price and quantity will decrease simultaneoiusly.

2.2.2 Supply curve for wheat will shift to right and downwards, equilibrium price will decrease and equilibrium quantity will increase.

2.2.3 Demand curve for wheat will shift to the right and upwards, equilibrium price will increase and equilibrium quantity will increase.

2.2.4 Demand curve for wheat will shift to the right and upwards, equilibrium price will increase and equilibrium quantity will increase.

2.2.5 Supply curve for wheat will shift to the left and upwards and demand curve will shift to the right. Equilibrium price will increase and equilibrium quantity will be uncertain or indeterminant.

3.1 **Utility**
Is a numerical score representing the satisfaction that a consumer gets from a given market basket.

3.2 **Marginal utility (MU)**
Additional satisfaction obtained from consuming one additional unit of a good.

3.3 Satisfaction is maximized (given the budget constraint) at the point where:

$MRS = \frac{P_X}{P_Y}$ or Indiffrence curve is tanget to the budget line

3.4

Bundle	MU of peanut buttrer	MU of Tuna	MRS
A	0.25	2.41	0.1037
B	0.31	1.50	0.2067
C	0.42	0.84	0.5
D	0.66	0.33	2

$Odwa\ is\ maximising\ satisfaction\ at$: $\frac{MU_x}{MU_y} = \frac{P_x}{P_y}$, That is $\frac{0.42}{0.84} = \frac{1}{2} = 0.5$.

That is on bundle C, MRS = $\frac{MU_x}{MU_y} = \frac{P_x}{P_y} = \frac{1}{2} = 0.5$

4.1

4.1.1 Profit maximisation condition:

$$MR = MC$$
$$200 - 2Q = 20$$
$$2Q = 200 - 20$$
$$Q = 90$$

4.1.2 Profit maximisation condition:

$$90 = 250 - 4P$$
$$4P = 250 - 90$$
$$P = R40$$

4.1.3 Total profit = Total revenue minus Total cost

$$1st\ find\ total\ revenue\ curve\ by\ integrating\ marginal\ revenue$$

$$TR = P \times Q = R40 \times 90 = R3600$$

$$TC = 10 \times 90 = R900$$

$$Total\ profit = R3600 - R900 = R2700$$

5.1 **Nash Equilibrium**

Nash equilibrium is a set of strategies (or actions) such that each player is doing the best it can given the actions of its opponents. Because each player has no incentive to deviate from its Nash strategy, the strategies are stable.

Dominant strategy

Is a strategy that is optimal no matter what an opponent does.

Dominant Strategies:	I'm doing the best I can *no matter what you do*. You're doing the best you can *no matter what I do*
Nash Equilibrium:	I'm doing the best I can *given what you are doing*. You're doing the best you can *given what I am doing*.

5.2.1 The nash equilibrium occurs at the bottom right C,C position.

Firm Y has a diminant strategy to always target the civilian research market.

Firm X does not have a dominant startegy.

However, Firm X's best response fo Firm Y's dominant strategy is to also the civilian market.

In this postion, each firm does its best given what the other firm does.

5.3 **Cournot equilibrium**

It is a Nash equilibrium in which each firm correctly assumes how much its competitor will produce and sets its own production level accordingly.

Stackelberg model

It is an oligopoly model in which one firm sets its output before other firms do, **First Mover Advantage**

Section B

1. 3 $800 - 80P = -200 + 120P$
$800 + 200 = 120P + 80P$
$1000 = 200P$
$P = R5$

$Q_d = 800 - 80(R5) = 400$

Or

$Q_s = -200 + 120(R5) = 400$

2. 4 If commodities are complements, increase in the price of one commodity will result in a left shift of the demand curve or if price of one commodity increase the demand curve of another will shift to the right.
3. 4
4. 3
5. 3
6. 4 $\frac{2000-2400}{45-40} \times \frac{[45+40]\div 2}{[2000+2400]\div 2} = -1.55$
7. 2 Repeated in 2017 Oct/Nov section B question 3

$Given\ Q_s = -300 + 15P, P_0 = R30\ and\ P_1 = R60$

1^{st}: $Calculate\ quantities\ for\ each\ price\ by\ substituting\ given\ prices\ into\ Q_s\ equation.$

$Q_0 = -300 + 15(30) = 150\ units\ and\ Q_1 = -300 + 15(60) = 600\ units$

$Arc\ elasticity\ general\ formula = \frac{\Delta quantity}{\Delta determinant} \times \frac{Average\ determinant}{Average\ quantity}$

$Arc\ elasticity\ general\ formula = \frac{600-150}{60-30} \times \frac{[60+30]\div 2}{[600+150]\div 2} = 1.8$

$where: 600 - 150 = 450, 60 - 30 = 30, [60 + 30] \div 2 = 45\ \&[600 + 150] \div 2 = 375$

$Therefore: \frac{450}{30} \times \frac{45}{375} = 1.8$ Thank you

8. 4
9. 1
10. 2
11. 2
12. 4
13. 1
14. 4
15. 2 **Repeated oct/nov 2017 question 9 section B**
$\boldsymbol{Q_a = Q_b, therefore\ R160 = R1(32units) + R4(32units)}$
16. 4 **Repeated oct/nov 2017 question 13 section B**
$\boldsymbol{FC = R20 \times 6 = R120}$ **, formula refer to question 1.2 section A**

$AFC = 120 \div 4 = 30$

17. 2 **Repeated as well**
18. 2 **Repeated as well**
19. 4
20. 3 **Assignment 02 sem 02 2018**
21. 3
22. 4
23. 1
24. 1
25. 2
26. 2
27. 1
28. 3
29. 2
30. 1

Oct/Nov 2018
Suggested Solutions

1.1 **QUESTION 1 (25 marks)**

1.1 The average monthly income of households in a certain town increases from R2 000 to R2 500 As a result, the quantity demanded of white bread increases from 1 000 to 1 100 units per day, the quantity demanded of brown bread decreases from 2 000 to 1 900 units per day and the quantity demanded of KFC (friend chicken) increases from 300 to 500 pieces per day

$Y_0 = R2000 \ \& \ Y_1 = 2500$
$D_{WB0} = 1000 \ \& \ D_{WB1} = 1100$
$D_{BB0} = 2000 \ \& \ D_{BB1} = 1900$
$D_{KFC0} = 300 \ \& \ D_{KFC1} = 500$

$$Arc\ elasticity\ general\ formula = \frac{\Delta quantity}{\Delta determinant} \times \frac{Average\ determinant}{Average\ quantity}$$

1.1.1 a) $Arc\ elasticity\ of\ D_{WB} = \frac{1100-1000}{2500-2000} \times \frac{[2500+2000]\div 2}{[1100+1000]\div 2} = 0.429\ (3\ d.p)$

b) $Arc\ elasticity\ of\ D_{BB} = \frac{1900-2000}{2500-2000} \times \frac{[2500+2000]\div 2}{[1900+2000]\div 2} = -0.231\ (3\ d.p)$

c) $Arc\ elasticity\ of\ D_{KFC} = \frac{500-300}{2500-2000} \times \frac{[2500+2000]\div 2}{[500+300]\div 2} = 2.25\ (3\ d.p)$

1.1.2

$Normal\ Goods\ (YED > 0)$	$Inferior\ Goods\ (YED < 0)$
White Bread KFC	Brown Bread

Refer to table on page 4 of Study Guide

1.1.3 a) $White\ Bread\ is\ a\ necessity\ because\ its\ YED\ lies\ between\ 0\ and\ 1$

b) $Brown\ Bread\ is\ neither\ necessity\ or\ luxury\ good\ since\ YED < 0$

c) $KFC\ is\ a\ Luxury\ good\ because\ its\ YED > 1$

1.2 20 labourers @ R60 per labourer

$AP\ for\ 20\ labourers = 3\ units\ per\ day$

$MP\ for\ 20^{th}\ labourer = 1\ unit\ per\ day$

$FC = R360$

Formulas:

- Average Total Cost (ATC) = Total Cost / Q (Output is quantity produced or 'Q')
- Average Variable Cost (AVC) = Total Variable Cost / Q
- Average Fixed Cost (AFC) = ATC – AVC
- Total Cost (TC) = (AVC + AFC) X Output (Which is Q)
- Total Variable Cost (TVC) = AVC X Output
- Total Fixed Cost (TFC) = TC – TVC
- Marginal Cost (MC) = Change in Total Costs / Change in Output
- Marginal Product (MP) = Change in Total Product / Change in Variable Factor
- Marginal Revenue (MR) = Change in Total Revenue / Change in Q
- Average Product (AP) = TP / Variable Factor
- Total Revenue (TR) = Price X Quantity
- Average Revenue (AR) = TR / Output
- Total Product (TP) = AP X Variable Factor
- Economic Profit = TR – TC > 0
- A Loss = TR – TC < 0
- Break Even Point = AR = ATC
- Profit Maximizing Condition = MR = MC
- Explicit Costs = Payments to non-owners of the firm for the resources they supply.

1.2.1 $Total\ Product = AP \times variable\ factor$

$Total\ Product\ or\ Output\ or\ Q = 3 \times 20 = 60\ units$

1.2.2 $Total\ Cost = TFC + TVC = TFC + AVC(Q) = 360 + 60(60) = R3960$

1.2.3 $ATC = \frac{3960}{60} = R66$

1.2.4 $MC\ of\ the\ 60^{th}\ unit\ of\ output = R60 \times \frac{1}{1} = R60,$
$were\ w = R60, \Delta L = 20 - 19 = 1\ \&\ \Delta q = MP\ for\ 20^{th}\ labourer = 1\ unit\ per\ day$

Borrowing from the slides:

$$\mathrm{MC} = \Delta \mathrm{VC}/\Delta q = w\Delta L/\Delta q$$

And

$$\mathrm{MC} = w/\mathrm{MP}_L$$

1.2.5 $AVC = \frac{ATC}{Q} = \frac{3600}{60} = R60$

2.1

2.1.1 Monopoly: Market with only one seller and many buyers

2.1.2 Oligopoly: a market in which only a few firms compete with one another, and entry by new firms is impeded.

2.1.3 Collusion: is collective action by buyers or sellers so as to influence the market (acquire monopoly power).

2.1.4 Interdependence between firms: occurs when actions of one firm affects another firm.

2.1.5 Monopolistic competition: Market in which firms can enter freely, each producing its own brand or version of a differentiated product.

2.2

Q	Total Revenue (TR)	Total Cost (TC)	Total Profit	Average Revenue (AR)	Average Total Cost (ATC)	Marginal Revenue (MR)	Marginal Cost (MC)
0	0	50	-50	-	-		
						300	250
1	300	300	0	300	300		
						275	225
2	575	525	50	287.5	262.5		
						250	200
3	825	725	100	275	241.67		
						150	175
4	1050	900	150	262.5	225		
						200	250
5	1250	1050	200	250	210		
						175	175
6	1425	1225	200	237.5	204.17		
						150	200
7	1575	1425	150	225	203.57		
						125	225
8	1700	1650	50	212.5	206.25		
						100	250
9	1800	1900	-100	200	211.11		
						75	275
10	1875	2175	-300	187.5	217.5		

$TC = TR - TR$

3.1 The following table shows the marginal and total utility that Thomas derives fro consumption of pizza slices during an all-you-can-eat lunch at the university's caf Use the information provided to answer the questions that follows

Number of pizza slices Eaten	Total utility	Marginal utility
0	0	
		40
1	40	
		32
2	72	
		27

3	99	
		24
4	123	
		18
5	141	
		8
6	149	
		0
7	149	
		7
8	142	

3.1.1 Thomas' addititonal utility from the consumtion of a fourth pizza slice is 24

3.1.2 Thomas' addititonal utility from the consumtion of a fourth pizza slice is 8

3.1.3 Total utility increases at a decreasing rate from first pizza slice to the sixth slice, from sixth to seventh slice there is no increase and from seventh to eighth slice total utility starts decline.

3.1.4 Marginal utility follows the law of diminishing marginal utility as Thomas eats more and more pizza

Explanation:
Diminishing marginal utility:
Principle that as more of a good is consumed, the consumption of additional amounts will yield smaller additions to utility.

The no question 4

5.1 **Cournot model**
Oligopoly model in which firms produce a homogeneous good, each firm treats the output of its competitors as fixed, and all firms decide simultaneously how much to produce.

Stackelberg model
Oligopoly model in which one firm sets its output before other firms do.

5.2

Firm A and B would choose to cut prices
- It is the dominant strategy
- If firm B cuts and Firm A Cuts Firm A would get 6
- If firm B colludes and frim A cuts Firm A would get 24
- It makes sense for firm A to cut
- Same logic applies to firm B

Section B

Qn.	Ans.	**Explanation**
1.	3	A change in the price of the product will result in a movement along the same market demand curve.
2.	3	(Perfect complements are two goods for which the MRS is zero or infinite; the indifference curves are shaped as right angles)
3.	2	$Given\ Q_s = -300 + 15P, P_0 = R30\ and\ P_1 = R60$

1^{st}: $Calculate\ quantities\ for\ each\ price\ by\ substituting\ given\ prices$

$into\ Q_s\ equation.$

$Q_0 = -300 + 15(30) = 150\ units\ and\ Q_1 = -300 + 15(60) = 600\ units$

$Arc\ elasticity\ general\ formula = \frac{\Delta quantity}{\Delta determinant} \times \frac{Average\ determinant}{Average\ quantity}$

$Arc\ elasticity\ general\ formula = \frac{600-150}{60-30} \times \frac{[60+30]\div 2}{[600+150]\div 2} = 1.8$

$where: 600 - 150 = 450, 60 - 30 = 30, [60 + 30] \div 2 = 45\ \&[600 + 150] \div 2 = 375$

$Therefore: \frac{450}{30} \times \frac{45}{375} = 1.8$ Thank you

4. 1 Slope of indference curve is:

$\frac{change\ in\ Y}{change\ in\ X} = -\frac{1}{2}\ and\ it\ is\ a\ straight\ since\ they\ are\ perfect\ substitutes.$

perfect substitutes Two goods for which the marginal rate of substitution of one for the other is a constant.

5. 1 Refer to figure 4.6 in textbook or slides

6. 3

Units	Total utility From cookies	Marginal Utility from cookies	Weighted Marginal utility	Total Utility From Rusks	Marginal Utility From Rusks	Weighted Marginal Utility
0	0			0		
		10	$\frac{10}{R1} = 10$		14	$\frac{14}{R1} = 14$
1	10			14		
		8	$\frac{8}{R1} = 8$		10	$\frac{10}{R1} = 10$
2	18			24		
		6	$\frac{6}{R1} = 6$		8	$\frac{8}{R1} = 8$
3	24			32		
		4	$\frac{4}{R1} = 4$		6	$\frac{6}{R1} = 6$
4	28			38		

$Consumer\ maximises\ satisfatcion\ when\ \frac{MU_x}{MU_y} = \frac{P_x}{P_y}\ or \frac{MU_X}{P_x} = \frac{MU_Y}{P_Y}$

Given R5 as income, use the following equation: $P_x.Q_x + P_y.Q_y = income$

$R1(1unit) + R1(2units) \neq R5$

$R1(2unit) + R1(3units) = 5$

$R1(3unit) + R1(4units) \neq 5$

7. 2 The consumer could gain more utility by consuming more A and less B, as stated in **2**.

Utility is maximised when the marginal utility per rand is equal between good A and B.

$$For\ good\ A, \frac{MU_A}{P_A} = \frac{100}{5} = 20$$

$$For\ good\ B, \frac{MU_B}{P_B} = \frac{160}{10} = 16$$

Since MU_A/P_A is greater than MU_B/P_B, utility can be increased by consuming more of good A and less of good B.

8. 2 **Isoquant Refer to figure 6.3 in unit 6**
Curve showing all possible combinations of inputs that yield the same output.

Marginal rate of technical substitution (MRTS) Amount by which the quantity of one input can be reduced when one extra unit of another input is used, so that output remains constant.

9. 2 $\boldsymbol{Q_a = Q_b, therefore\ R160 = R1(32units) + R4(32units)}$

10. 3 **Refer question 4 section B**

11. 3 **OCDQ**

12. 3 **Profit maximization condition:**
$MR = MC$

13. 4 $\boldsymbol{FC = R20 \times 6 = R120}$ **, formula refer to question 1.2 section A**
$\boldsymbol{AFC = 120 \div 4 = 30}$

14. 3

15. 2 **Refer to 8.6**

16. 4

17. 2 **350-250=100**

18. 1 $\frac{27000}{15000} = 1.8$

19. 2

20. 1

21. 3 **One of the characteristics of perfect market**

22. 2 **Raw materials and labour are variable costs** $= R2000(10 \times R700) = R9000$
Capital and land i.e rent are fixed cost =R2 250

23. 1

24. 3

25. 3 $\frac{MP_L}{MP_K} = \frac{w}{r}$

$\frac{15}{45} = \frac{300}{900}$

26. 1 When a market is in equilibrium, firms are doing the best they can and have no reason to change their price or output.

Nash Equilibrium
Equilibrium in oligopoly markets means that each firm will want to do the best it can, given what its competitors are doing, and these competitors will do the best they can, given what that firm is doing.

Nash equilibrium Set of strategies or actions in which each firm does the best it can given its competitors' actions.

27. 1 R2 805 000 – R2 800 000

28. 4 **Cournot model**
Oligopoly model in which firms produce a homogeneous good, each firm treats the output of its competitors as fixed, and all firms decide simultaneously how much to produce.

29. 3 **Stackelberg model**

Oligopoly model in which one firm sets its output before other firms do.

Suppose Firm 1 sets its output first and then Firm 2, after observing Firm 1's output, makes its output decision. In setting output, Firm 1 must therefore consider how Firm 2 will react.

30. 1