Sample test

Instructions: Please attempt these questions without using a calculator, spreadsheet, or other aids as only pen and paper are permitted during the actual test.

Case

The University of Oldtown, a research and teaching institution, has a total enrolment of approximately 15,000 graduate and undergraduate students in 2007-08 across a range of disciplines, including arts and science, nursing, business, engineering, medicine, and law. The student body is predominantly local with a strong international complement of 2,000 students. International students are important to the institution because they pay between 2-3 times the fees of local students.

The University has recently hired a new Dean to provide experienced leadership through challenging times. University of Oldtown's reputation has been slipping, and last year was completely omitted from the Top 100 Universities list. The perceived drop in educational quality has led to fewer applications (particularly from international students), greater difficulty attracting and retaining leading scholars and more difficulty in fundraising to pay for new infrastructure and research chairs.

The Dean has hired 2020 Delivery to analyse the current situation and support his decision-making to return the University of Oldtown to its rightful place as one of the world's leading universities.

Table 1: Financial summary for 2007-08

Revenue	£ million	Costs	£ million
Student fees	120	Faculty and research	175
Government funding	140	Administration, student services, maintenance and other admin	100
Fundraising, investment income and other income	40	Scholarships and bursaries	30

Question 1

Based on the following chart and the information provided above, what change would you expect in the University's financial situation from 2008-2012?

Chart 1: Total University of Oldtown enrolment projection, 2008-2012
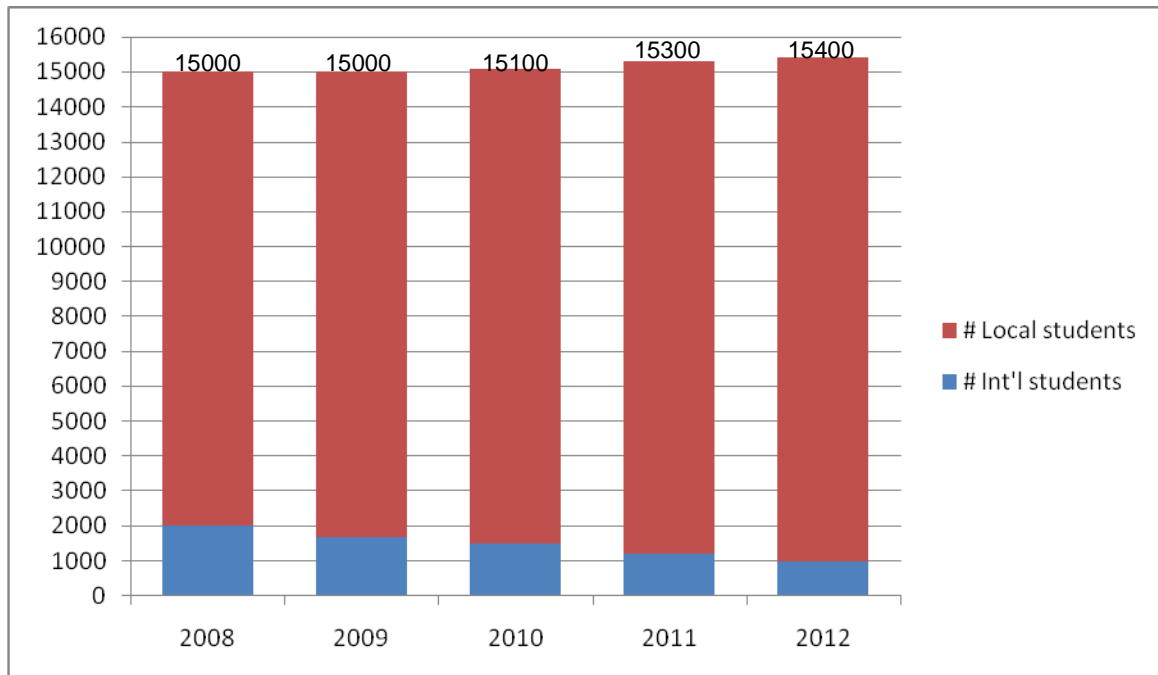
a) The financial situation will remain the same
b) The financial position will be worse
c) The financial position will be better
d) There is not enough information to answer the question

Question 2

Assume that the average local student fee is £7,000.00 and the average international student fee is £16,000.00. If the University of Oldtown increased international student enrolment by 30% and reduced local student enrolment by 10%, what would the net financial position be assuming all other costs and revenues remain stable?

a) £10.1 million surplus
b) £120.5 million surplus
c) £1.5 million deficit
d) £5.0 million deficit

NOTE: The rate at which costs change relative to changes in income is known as a "scaling factor". A scaling factor of 90% means that for every doubling of students admitted, costs only go up by 90%. Likewise, if income from students admitted were reduced by 50%, costs would only fall 45%.

Question 3

Assuming a scaling factor of 80% for faculty and research, 40% for administration, and 100% for scholarships, project the total net gains/losses over the next two years if the University attracts 5% more students per year. Assume the ratio of international and local students remains the same as in 2007-08.

    a) £23.6 million net loss
    b) £3.9 million net gain
    c) £3.9 million net loss
    d) £28.6 million net loss

The Dean is considering investing in a new programme or school to revitalise University of Oldtown's infrastructure and improve its long-term financial position. He is sure he can raise the necessary capital investment to cover upfront costs through generous donors, but is aware that running a new school or programme might impose a financial burden. The Dean is hopeful that the new investment might help him pay off the University's debt, and wants 2020 to determine if this is possible.

The Vice-Principal for Research is lobbying strongly for a new microbiology laboratory and teaching facility that will attract top researchers to the University and create capacity for another 200 students. The Dean, however, thinks the University should develop a top-flight international MBA programme with a strong international component to bolster its world-wide reputation and attract more international students. Other members of the University's senior management team favour a variety of other programme options. Table 2 provides more details on the options.

Table 2: Projections for potential new programmes

Programme	# Local students	Fee per local student	# International students	Fee per int'l student	# of faculty required	# of class hours taught per faculty member, per week	Average salary per faculty member	Annual administration, maintenance and other costs
iMBA	25	£10,000	?	£20,000	15	3	£65,000	£240,000
Microbiology	120	£7,000	80	£15,000	18	6	£45,000	£400,000
Other	?	?	?	?	?	?	?	?

Question 4

How many international students must the iMBA enrol in order to generate enough revenue to break even?

a) 38
b) 49
c) 55
d) 48

Question 5

If you were advising the Dean on which new programme or programmes to establish to pay off the debt as quickly as possible, what information would you need to make a recommendation?

a) The current and projected debt
b) The cost and time involved with launching each programme option, including the cost of any capital employed
c) The projected operating costs and revenues associated with each of the programme options
d) All of the above
e) Only b) and c)

Solutions

1. Answer: b) The financial situation will be worse. We know this to be the case because the background stipulates that international students pay 2-3 times the tuition fees of local students. Thus, the slight increase in the total number of students (15,000 to 15,400) will not provide enough revenue to offset the decline in the international student body, which falls from 2000 to 1000 over the five years presented in the graph.

2. Answer: c) £1.5 million deficit. To solve the problem, first note that the University has 15,000 total students, of which 2000 are international. This leaves 13,000 local students. The problem sets out a 30% increase in international students, which can be calculated by multiplying 1.30 x 2000 = 2600. The problem also notes a 10% decrease in local students, which can be calculated by multiplying .10 x 13,000 = 1300, then subtracting 1300 from the original local student population 13,000 – 1300 = 11,700. Now that we have the correct populations as set out in the problem, we must calculate the student fees generated by those populations. Based on the average fees provided in the problem, total local student revenue is calculated by multiplying 11,700 x £7000 = £81.9 million and total international student revenue is calculated by multiplying 2600 x £16000 = £41.6 million. Total student fee revenue then is 81.9 million + 41.6 million = £123.5 million. The problem states that all other revenues and costs remain stable, and these are provided in the case background. To calculate, add student fees (123.5 million) plus government funding (140 million) plus fundraising and other income (40 million), and subtract faculty and research (175 million), administration (100 million) and scholarships (30 million). Total revenues are 303.5 million, subtract total costs of 305 million = £1.5million deficit.

3. Answer: a) £23.6 million net loss over two years. If the ratio of international and local students is held constant, then the only piece of information requiring manipulation on the revenue side is the total student fee figure given in Table 1 (£120 million). For example, to find the total expected revenue under year 1 of the 5% growth pattern, multiply 1.05 x 120 million = 126 million. For year two, multiply 1.05 x 126. A scaling factor of 80% for faculty and research is provided, leading to a growth pattern of .8 x 5% = 4%. The growth pattern for administration is based on a 40% scaling factor, leading to .4 x 5% = 2%, and 100% scaling for scholarships leads to a 5% growth pattern. The results are best expressed in a table:

	Category	Baseline	Year 1	Year 2
Revenue	Student fees	120.0	126.0	132.3
	Government funding	140.0	140.0	140.0
	Fundraising and other	40.0	40.0	40.0
	Total revenue	**300.0**	**306.0**	**312.3**
Costs	Faculty and research	175.0	182.0	189.3
	Administration	100.0	102.0	104.0
	Scholarships	30.0	31.5	33.1
	Total costs	**305.0**	**315.5**	**326.4**
Total		-5.0	-9.5	-14.1

The total net gains/losses are calculated by adding the total for years 1 and 2 (-£23.6 million)

4. Answer: b) 49 international students. To answer this question, first determine the costs involved in running the program. Each faculty member is paid £65,000 annually, and there are 15 faculty members (15 x 65,000 = £975,000). There are also £240,000 in administration and other costs, bringing the total to 975,000 + 240,000 = £1.215 million. On the revenue side, we know there are 25 local students paying £10,000 each, for a total of £250,000. Therefore, international student revenues must total £965,000 in order for the programme to break even. Calculate this by cross-multiplying, using 'x' for the number of students and 20,000 for the student fees paid, and find 48.25 as the answer. Since the school cannot admit one-quarter of a student, they will require 49 international students to break even.

5. Answer: e) only b and c. To make an informed recommendation of which programme or programmes to launch to pay off the debt as quickly as possible, you would need to know the projected operating costs and revenues for each option (c). You would also need to know how long it would take for each of the options to start generating that revenue, and how much it would cost to launch (including the cost of capital if the money to support the launch were borrowed) (b). With this information in hand, one could compare the various options and determine the best mix to maximise revenue generation in the shortest amount of time. While it is tempting to select answer d), in fact the level of current and projected debt is not a requirement to help the Dean decide on the best option – knowing the level of debt will not change the amount of revenue generated by any of the programme options, which is the variable of interest in this problem.