

JARAMOGI OGINGA ODINGA UNIVERSITY

MAY-AUGUST 2014 SEMESTER EXAMS

ABA 107: MANAGEMENT MATHEMATICS

TIME: 2HOURS

INSTRUCTIONS: Answer Question one and any other two.

- 1 (a) If  $x = (a, b, c, d, e)$ ,  $Y = (c, d, e, f)$  and  $Z = (a, c, d, e, g, h)$  within a universal set of  $(a, b, c, d, e, f, g, h, i)$ , list the elements of the following:
- i.  $X \cup Y$  (2MKS)
- ii.  $(X \cap Y)^1$  (2MKS)
- (b.) Find the equation of the line perpendicular to the line  $y - 5x + 3 = 0$  and passing through Points  $(3, 2)$ . (4mks)
- (c.) Solve the following simultaneous equations
- $$\begin{aligned} 2x + 3y &= 2 && (4\text{mks}) \\ 5x + 2y &= 6 \end{aligned}$$
- (d.) Solve  $x^2 + 6x + 9 = 0$  (6mks)
- (e.) A firm buys a power press for £32,500 which is expected to last for 20 years and to have a scrap value of £7,500. If depreciation is on the straight line method how much should be provided for in each year? (4mks)
- (f.) In question (e) above what would be the depreciation rate as a percentage if the depreciation was to be calculated on the reducing balance method? (4mks)
- (g.) A finance company loans money at 20% nominal interest but compounds monthly. What is the APR? (4MKS)

2. (a) It is estimated that an investment in a new process will cause the following cash flow in (£):

End year	0	1	2	3	4	5	6
Cash inflow			15,000	20,000	20,000	20,000	20,000
Cash outflow	60,000	10,000					

The firm wishes to earn at least 15% per annum on projects of this type calculate the Net present value of the project and comment on the course of action to be taken (10mks)

- (b).i. Find the equation of a straight line passing through x-axis at  $x = 8$ . (5mks)
- ii. what is the present value of a debt of £12,000 taken out over 6 years at 14.5% interest if discount rate is 9.5%? (5mks)

3. (a) A firm is considering two separate capital projects with cash flows as follows:

Year	0	1	2	3	4	5
Project 1	80,000	18,000	20,000	25,000	38,000	45,000
Project 2	120,000	30,000	50,000	50,000	50,000	15,000

- Using the NPV criterion and a discount rate of 15%, choose the project that is more profitable (8mks)
- Find the NPVs using a discount rate of 20% and use the results to estimate the IRR for each project. (8mks)
- Verify that, using the IRR criterion the decision in (a) is reversed and attempt to explain why. (4mks)

4. (a) A B C D is a rectangle with the centre at the origin. A is the point (5,0), point B and C lie

On the line  $2z=x+5$ . Determine the coordinates of the other vertices. (6mks)

(b) Determine the present value of £125, payable at the end of each of five years and subject to a discount rate of 8%. (4mks)

(c.) A survey of 600 jua kali workers showed that 310 regularly listened to the seven

O'clock news on radio and that 370 regularly listened to late- night news on radio,

While 120 regularly listened to both news casts.

Determine the workers who listened to:

- The seven o'clock news but not the late- night news
- The late-night news but not the seven o'clock news
- Exactly one of the news broadcasts
- At least one of the news broadcast

5. The following two capital projects involve the purchase, use and final disposal of two Machines A and B.

		Net cash flows			
	Initial cost	Year 1	Year 2	Year 3	Year 4
Machine A	50,000	25500	24500	17000	14000
Machine B	45,000	12500	15500	21000	38,000

Note that year 4 includes scraps values of £5000 for machine A and £4000 for machine B.

Choose between the two projects using each of the following methods in turn:

- a. Net present value – using a cost of capital of 22% and 28%. (10mks)
- b. Internal rate of return –estimate its value using the results of (a) (10mks)