**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:
2. XUY (2MKS)
3. (XNY)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

 2x+3y=2 (4mks)

 5x+2y=6

 (d.) Solve x2+6x+9=0 (6mks)

 (e.) A firm buys a power press for £32,500 which is expected to last for 20years and to

 Have a shop 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 anew 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 £12,000taken out over 6yearsat14.5% 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 | 50,0000 | 50,000 | 50,000 | 15,000 |

1. Using the NPV criterion and a discount rate of 15%, choose the project that is more profitable (8mks)
2. Find the NPVs using a discount rate of 20% and use the results to estimate the IRR for each project. (8mks)
3. 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:

1. The seven o’clock news but not the late- night news
2. The late-night news but not the seven o’clock news
3. Exactly one of the news broadcasts
4. 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:

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