**P.R.GOVT. COLLEGE (AUTONOMOUS), KAKINADA.**

**I B.SC, ACTUARIAL SCIENCE/SECOND SEMESTER -2018-19**

**I B.SC, (MSAS) - PAPER - II**

**BASICS OF FINANCIAL MATHEMATICS**

**SEMESTER - II**

**Total Hrs. of Teaching-Learning:60 @ 4 h/Week Total Credits:03**

Unit-I Hours:12

Simple and Compound interest, Compound interest tables, Present Value, Normal and Effective rates of interest, Effective rate corresponding to a nominal rate and Vice-Versa, Discount and Discounted value, Varying rates of interest, Equation of Value, Equated time of payment.

Unit-II Hours:12

Repayment of loan by uniform installments when the frequency of installments is the same as that with which interest is convertible, Repayment of loan by uniform installments consisting of both interest and principle repayment, when the frequency of installment is different from that with which interest is convertible, Redemption of Loans by a sinking fund, Lender’s sinking fund, Further consideration on redemption of loan, Capital redemption policies, Office premiums, Surrender Value.

Unit-III Hours:12

Nominal and Effective rates of Discount, Average interest yield on the life fund, Money weighted rate of return, Time weighted rate of return and linked internal rate of return,.

Unit-IV Hours:12

Column $l\_{x}$ , Column $d\_{x}$ , Column $q\_{x}$ , Column $p\_{x}$ , The probabilities of survival and death, Stationary population, $L\_{x}$ , $T\_{x} ,$ Curtate expectation of life, Complete expectation of life, Central death rate $M\_{x} ,$ Selection and select rates, Ultimate table, Aggregate table. Construction of Mortality tables, Stages involved in construction of mortality table, The data to be used, Period of investigation, Unit of investigation, The method of investigation, Census method, application of census method to life office data, Determination of exposed to risk and deaths.

Unit-V Hours:12

Life Assurance premiums-General Considerations, Assurance benefits-Pure Endowment assurance, Endowment assurance, Temporary Assurance or Team assurance, Whole life Assurance, Double Endowment assurance , Increasing Temporary Assurance, Increasing Whole life Assurance, Commutation functions $D\_{x}$ , $C\_{x}$ , $M\_{x}$ , and $R\_{x}$ , Expressions for present values of assurance benefits in terms of Commutation functions, Fixed term ( Marriage ) Endowment, Educational annuity plan.

Suggested Readings:

1. An Introduction to Mathematics of finance by J.J.McCUTCHEON and W.F.SCOTT
2. ActurialMathematicas by Bowers Gerber Hickman Jpmes Nesbitt

**BLUE PRINT FOR THE QUESTION PAPER SETTER**

**PAPER - BASICS OF FINANCIAL MATHEMATICS**

**(FOR I B.Sc ACTUARIAL SCIENCE) SEMESTER-II**

**Max. Marks: 60 Time: 2 ½ Hours**

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| --- | --- | --- | --- |
| **CHAPTER NAME** | **ESSAY QUESTIONS****10 MARKS** | **SHORT QUESTIONS****05 MARKS** | **MARKS ALLOTTED****TO CHAPTER** |
| **I.** Unit –I | **02** | **01** | **25** |
| **II. Unit – II**  | **02** | **01** | **25** |
| **III. Unit –III**  | **01** | **01** | **15** |
| **IV. Unit –IV**  | **02** | **02** | **30** |
| **V. Unit –V**  | **01** | **01** | **15** |
| **TOTAL MARKS INCLUDING CHOICE** | **08** | **06** | **110** |

**SAQ=Short answer questions (5M), EQ=Essay questions (10M)**

 **Internal Assessment for 40 Marks*:***

 Short Answer Questions : 10 x 2 = 20M

 Essay Type Questions : 4 x 5 = 20M

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 Total : 40M

**P.R.GOVERNMENT COLLEGE(AUTONOMOUS), KAKINADA**

**MODEL PAPERS FOR THE YEAR 2018-2019**

**I YEAR B.Sc. (MSAS)PAPER – II**

**MODEL PAPER**

**BASICS OF FINANCIAL MATHEMATICS**

 **SEMESTER-II**

**DATE: Max. Marks: 60**

**TIME:**

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 **SECTION-A**

**Answer Any Four questions 4X5=20 M**

1. Explain the normal and effective rate of interest?
2. Explain the repayment of loan by uniform installments ?
3. Explain the capital redemption policies?
4. Explain select and ultimate life table?
5. Write a short note on mortality table?
6. Define life Assurance premiums and its benefits?

**SECTION-B**

**Answer any TWO of the following 2X10=20M**

1. What is a actuarial present value ? and explain the relation ship between effective rate and nominal rate with their equations?
2. Explain redemption of loans by a sinking fund and lender’s sinking fund?
3. Explain office premiums, Surrender Value.?
4. Explain nominal and effective rates of discount and average interest yield on the life fund?

**SECTION-C**

**Answer any TWO of the following 2X10M=20M**

1. Explain in brief about the curtate expectation of life and complete expectation of life?
2. What is period of investigation? how Census method is applicable to life office data, ?
3. What are different types of assurance and explain the double endowment assurance ,
4. Explain the present values of assurance and its benefits in terms of Commutation functions?