Government College (Autonomous)
Rajamahendravaram
NAAC Accredited at 'A+' Grade

DEPARTMENT OF ACTUARIAL SCIENCE

B.Sc.(V&VI)SEMESTERS

SYLLABUS & MODEL PAPERS
2024-2025

B.Sc. (ACTUARIAL SECIENCE)

S.NO	SEMESTER	TITLE OF THE PAPER	COURSE CODE
1	V	LONG TERM INTERNSHIP	-----
2	VI	A1-Paper-VI - :Life Contingencies-1	SAS104
3	VI	A2-Paper-VII - Life Contingencies-2	SAS105
4	VI	B1-Paper-VI - Principles of Insurance	SAS106
5	VI	B2-Paper-VII - Practice of Insurance	SAS107
6	VI	C1-Paper-VI –Survival analysis and Bio Statistics	SAS108
7	VI	C2-Paper-VII - Actuarial Applications	SAS109

STRUCTURE OF B.Sc. (ACTUARIAL SECIENCE)

Semester	Paper	Subject	Hrs.	Credits	IA	ES	Total
THIRD YEAR							
Semester V	**Paper-VI**	**A1- Life Contingencies-1**	**6**	**5**	**50**	**50**	**100**
(OR)	**Paper-VII**	**A2- Life Contingencies-2**	**6**	**5**	**50**	**50**	**100**
	OR						
	Paper-VI	**B1- Principles of Insurance**	**6**	**5**	**50**	**50**	**100**
Semester VI	**Paper-VII**	**B2- Practice of Insurance**	**6**	**5**	**50**	**50**	**100**
	OR						
	Paper-VI	**C1- Survival analysis and Bio Statistics**	**6**	**5**	**50**	**50**	**100**
	Paper-VII	**C2- Actuarial Applications**	**6**	**5**	**50**	**50**	**100**

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VI			
Course Code SAS104	**TITLE OF THE COURSE** **Life Contingency-1**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	To have knowledge in Mathematics and Statistics and Insurances		6	0	3

CourseObjectives:

The Objective of this course is to

1. **gain knowledge about insurance and its features**
2. **know about various types of insurances and their benefits**

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	Understand the basics of Insurance
CO2	Work on Mortality tables
CO3	Work on benefits of insurance on both death and survival
CO4	Calculate the commutation function
CO5	Calculate amount of Annuities and rates applicable

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT-I

Net premiums or Benefit premiums

The random future loss under an assurance or annuity contract, state the principle of equivalence, Notations and formulae of net premium for common life insurance contracts, Fully Discrete Premiums, True m-thly payment premium, Commutation functions, increasing and decreasing Benefit premiums, Profits contract, Types of bonus, Calculating net premiums for with-profit contracts.

UNIT-II

Benefit Reserves

Prospective and Retrospective Reserves , Net future random loss for reserves, Conditions for equality of prospective and retrospective Reserves, Fully Continuous Benefit Reserves, other formulas for fully Continuous Benefit Reserves, Fully Discrete Benefit Reserves, Differential Equation, Death strain at risk(DSAR), Expected death strain(EDS),Actual death strain (ADS), Mortality profit, Mortality profit on a portfolio of policies.

UNIT-III

Analysis of Benefit Reserves

Benefit Reserves for General Insurances, Recursion Relations for Fully Discrete Benefit Reserves, Benefit Reserves at Fractional Durations.

UNIT-IV

Insurance Models Including Expenses

List the type of expenses incurred in writing a life insurance contract, Describe the influence of inflation on the expenses, Define the gross future loss random variable for the benefits and annuities using equivalence principle.

UNIT-V

Multiple Life Functions

Joint distribution of Future Lifetimes, The Joint-Life Status, The Last-Survivor Status, More Probabilities and Expectations, Dependent Lifetime Models: Common Shock, Insurance and Annuity Benefits: Survival Status, Special Two-Life Annuities, Reversionary Annuities, Simple Contingent Functions.

Textbooks:

1. 1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2286),
2. Actuarial Mathematics, The society of actuaries.

Referencebooks:

1. Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.

Web Links:

https://www.startertutorials.com/uml/principles-of-modeling.html
https://learn.filtered.com/blog/the-principles-of-modelling

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	3	3	2	2	1	2	2	2
CO2	2	2	1	3	2	3	2	3	2	1	3	2	1
CO3	3	1	2	1	2	3	1	3	12	2	2	3	1
CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) -2024-25

III B.Sc. Statistics/Semester-VI- Actuarial Science

LIFE CONTINGENCIES-I Paper-VI—A1

(MODEL QUESTION PAPER)

Time: 2 1/2hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions: **5X4=20 M**

1. State the principle of equivalence ?
2. Explain the notations and formulae of net premium for common life insurance contracts ?
3. Explain Fully Continuous Benefit Reserves?
4. Explain Recursion Relations for Fully Discrete Benefit Reserves?
5. Describe the influence of inflation on the expenses?
6. Describe Joint distribution of Future Lifetimes?
7. Write short note on Insurance Models
8. Write Short note on benefit Reserves ?

SECTION-B

Answer any THREE questions: **3X10=30M**

9. Write a brief note on discrete premiums.?
10. For Insurance contract and assumptions of an aggregate mortality law

    (i) Exhibit the formulas for the d.f and p.d.f of conditional distribution for t^L, given T(x)>t

    (ii) Display graphs of these conditional p.d.f's for t=0,20,40,50
11. Define the gross future loss random variable for benefits.?
12. Write short note on joint distribution of future life time?
13. Write notes on true m-thly premiums.?

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VII			
Course Code SAS105	**TITLE OF THE COURSE** **Life Contingency-2**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites	To have knowledge in Mathematics and Statistics and Insurances	0	6	0	3

CourseObjectives:

The Objective of this course is to

1. gain knowledge about insurance and its features
2 study about life tables and its uses in estimating the survival rate
3. know about various types of insurances and their benefits

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	Understand the basics of Insurance
CO2	Work on Mortality tables
CO3	Work on benefits of insurance on both death and survival
CO4	Calculate the commutation function
CO5	Calculate amount of Annuities and rates applicable

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

Unit:1
Multiple Decrement Model
Two random variables, Random Survivorship Group, Deterministic Survivorship Group, Associated single Decrement tables: Basic Relationship, Uniform Distribution Assumption for multiple decrements, Construction of Multiple decrement table, Relationship between single and multiple decrement tables.

Unit:2

Application of multiple decrement theory

Actuarial present value and their numerical evaluation, benefit premium and reserves, competing risks, multiple state modelling, multiple state Markov model, Kolmogorov forward equations, multiple decrement tables.

Unit:3

Profit testing

Discounted emerging costs, unit-linked contract, Profit test annual premium contracts, the profit vector, the profit signature, the net present value and the profit margin, determining premiums using profit test,

Unit:4

Profit criterion, determiningreserves using profit testing,
Zeroising negative cashflows, Equity-linked insurance,
deterministic profit testing for equity linked insurance, Stochastic profit testing, Stochastic pricing, Stochastic reserving.

Unit:5

Pension funds

Multiple decrement service table for pensions calculations, updating a service table, the salary scale function, setting the DC contribution, the service table, funding plans, valuation of benefits: Final salary plans, Career average earnings plans.

Textbooks:

1. 1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2286),
2. Actuarial Mathematics, The society of actuaries.

Referencebooks:

1. Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.
2. David, C. M., Dickson, Mary R. Hardy and Howard, R. waters.(2009). Actuarial

Web Links:

https://www.startertutorials.com/uml/principles-of-modeling.html
https://learn.filtered.com/blog/the-principles-of-modelling
https://en.wikipedia.org/wiki/Survival_analysis

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	3	2	3	2	2	3	3	2	2	1	2	2	2
CO2	2	2	1	3	2	3	2	3	2	1	3	2	1
CO3	3	1	2	1	2	3	1	3	12	2	2	3	1
CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) -2024-25
III B.Sc. Statistics/Semester-VI- Actuarial Science
LIFE CONTINGENCIES-II
Paper-VII-A2
(MODEL QUESTION PAPER)

Time: 2 1/2hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions : **5 x4 = 20M**

1. Write a short note on random survivorship group.?
2. Write a short note on multiple state model.?
3. Write a short note on multiple state markov model.?
4. Describe the types of benefit provided by unit-linked contract.?
5. Define net present value and profit margin.?
6. Explain funding plans.?
7. Explain multiple decrement models.?
8. Define profit test annual premium

SECTION-B

Answer any THREE questions **3X10=30M**

9. Explain uniform distribution assumption for multiple decrements.?
10. Explain actuarial present value and their numerical evaluation .?
11. Write a short note on unit linked contract or assurance?
12. Explain the fully continuous and fully discrete premiums?
13. Explain stochastic profit testing?

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VI			
Course Code SAS106	TITLE OF THE COURSE PRINCIPLES OF INSURANCE- B1				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	To have knowledge in Mathematics and Statistics and Insurances		6	0	3

CourseObjectives:

The Objective of this course is to

1. gain knowledge about insurance and its features

2 study about life tables and its uses in estimating the survival rate or mortality rate

3. know about various types of insurances and their benefits

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	Understand the basics of Risk Management
CO2	Work on Insurance Market
CO3	Work on benefits of insurance on Insurance Customers
CO4	Calculate the Insurance Contract
CO5	Learn about Insurance Terminology

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

Unit-I

Risk Management: Meaning of risk and distinguish between different types of risks, Risk analysis and risk management techniques, Concept of risk retention for individuals.

Unit-II

Insurance Market: Indian insurance market, role of intermediaries: agents, brokers; role of specialists: surveyors, medical examiners, third party administrators(TPA); role of regulator and other bodies.

Unit-III

Insurance Customers: Concept of Insured customer, different types of customers, concept of customer mindset and customer satisfaction, importance of ethical behavior.

Unit-IV

Insurance Contract: Notion of insurance contract, significance of principle of insurable interest, principles of indemnity, principles of subrogation and contribution, principles of utmost good faith, concept of proximate cause.

Unit-V

Insurance Terminology: Concept of life and non-life insurance, terms specific to life insurance, terms specific to non-life insurance.

Textbooks:

1. 1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2286),
   Actuarial Mathematics, The society of actuaries.

Referencebooks:

1. Principles of Insurance, IC-01, Insurance institute of India.
2. Principles of Insurance and Banking, Dr. S.S. Kundu, Dr. B.S. Bodla

Web Links:

https://www.startertutorials.com/uml/principles-of-modeling.html
https://learn.filtered.com/blog/the-principles-of-modelling
https://en.wikipedia.org/wiki/Survival_analysis
https://link.springer.com/chapter/10.1007%2F978-3-662-03460-6_2

CO-POMapping:

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CO1	3	2	3	2	2	3	3	2	2	1	2	2	2
CO2	2	2	1	3	2	3	2	3	2	1	3	2	1
CO3	3	1	2	1	2	3	1	3	12	2	2	3	1
CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) -2024-25

III B.Sc. Statistics/Semester-VI- Actuarial Science

PRINCIPLES OF INSURANCE-Paper-VI-B1

(MODEL QUESTION PAPER)

Time: 3hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions **5X4=20M**

1. Write Distinguish between different types of risks?
2. Explain the role of intermediaries?
3. Explain the different types of customers ?
4. Explain of significances of principal of Insurance interest?
5. Explain the concept of risk of retention for individuals?
6. Explain the concept of customer satisfaction?
7. Explain the role of specialists?
8. Explain the concept of Risk Management

SECTION-B

Answer any THREE questions **3X10=30M**

9. Explain the risk analysis and risk management techniques?
10. Explain the importance of ethical behavior?
11. Explain the role of third party administrators?
12. Explain the principals of subrogation and contribution?
13. Explain the principals of utmost good faith and proximate cost?

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VII			
Course Code SAS107	TITLE OF THE COURSE **PRACTICE OF INSURANCE- B2**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	To have knowledge in Mathematics and Statistics and Insurances	0	6	0	3

CourseObjectives:

The Objective of this course is to

1. gain knowledge about insurance and its features

2. know about various types of insurances and their benefits

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	Understand the basics of Insurance
CO2	Work on Premiums and bonuses
CO3	Work on Plans of Life Insurance
CO4	Calculate the Annuities
CO5	Calculate amount of Annuities and rates applicable

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

Unit-I

Practice of Life Insurance: Introduction, Over view of Indian insurance market, growth of insurance business in india, liberalization of Indian insurance sector, organizational structure of LIC.

Unit-II

Premiums and bonuses: Concept of premium, different types of premiums, factors involved in the calculation of premium, concept of bonus.

Unit-III

Plans of Life Insurance: various life insurance plans, importance of ULIPs, importance of riders, industrial life insurance, benefits of MWP, importance of key-man insurance, importance of health insurance.

Unit-IV

Annuities: Concept of annuity, analysis of different types of annuity plans, advantages and disadvantages of annuity.

Unit-V

Group Insurance: Importance of group insurance, different group insurance schemes, group insurance classifications, features of group insurance schemes, group superannuation schemes, group leave encashment scheme, group insurance scheme in view of EDLI, social security scheme.

Textbooks:

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2286),
Actuarial Mathematics, The society of actuaries.

Referencebooks:

2.Principles of Insurance, IC-01, Insurance institute of India.

3. Principles of Insurance and Banking, Dr. S.S. Kundu, Dr. B.S. Bodla

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CO2	2	2	1	3	2	3	2	3	2	1	3	2	1
CO3	3	1	2	1	2	3	1	3	12	2	2	3	1
CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) -2024-25

III B.Sc. Statistics/Semester-VI- Actuarial Science

PRACTICE OF INSURANCE(Cluster-2,Paper-2) Paper –VII-B2

(MODEL QUESTION PAPER)

Time: 2 1/2hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions **5X4=20M**

1. Explain the growth of insurance business in India?
2. Explain organizational structure of LIC
3. Write the different types of premiums
4. Write the various life insurance plans
5. Write the benefits of MWP
6. Write the advantages and disadvantages of annuity
7. Write the group insurance classification
8. Write short note on Annuities

SECTION-B

Answer any THREE questions **3X10=30M**

9. Explain briefly about Indian insurance market?

10. Write factors involved in the calculation of premiums and the concept of bonus

11. Write the importance of key-man insurance and health insurance

12. Explain the concept of premiums and write different types of premiums

13. Write the analysis of different types of annuity plans

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VI			
Course Code SAS108	**TITLE OF THE COURSE** **SURVICAL ANALYSIS AND BIO STATISTICS**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	To have knowledge in Mathematics and Statistics and Insurances		6	0	3

CourseObjectives:

The Objective of this course is to

1. **Gain knowledge about survival distribution and its applications**

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	To learn about Survival distributions
CO2	To learn about Censoring Schemes
CO3	Work on Competing Risk Theory
CO4	To learn about Stochastic epidemic Models
CO5	To learn about Statistical Genetics

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

UNIT I

Introduction: Meaning, of survival analysis ,Survival distributions and their applications-Exponential, Gamma, weilbull, Lognormal and their density functions

UNIT II

Censoring Schemes: type -1 ,types II and Progressive or random censoring with biological examples Estimation mean survival time and variance of the Type -1 and types II Censored data

UNIT III

Competing Risk Theory : Indices for measurement of Probability of death under competition risks and their inter-relations. Estimation of probabilities of death using maximum likelihood principle and modified minimum chi-square methods

UNIT IV

Stochastic epidemic Models : Simple epidemic models, general epidemic model definition and concept duration of an epidemic

UNIT V

Statistical Genetics: Introduction, Concept –Genotype,Phenotype,Dominance Excessiveness ,linkage and recombination ,coupling and repulsion ,Random mating,Gametic array.Distribution of Genotypes under random mating, Clinical trails planning and design of clinical trails ,Phase I,II and III trails .Single Blinding

Textbooks:

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(2286),Actuarial Mathematics, The society of actuaries.

Referencebooks:

1. Biswas Applied stochostics Process
2. Medical biostatisticsby Indrayn A (2008)

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CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

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CBCS SYLLABUS (Semester Wise) -2024-25

III B.Sc. Statistics/Semester-VI- Actuarial Science

SURVICAL ANALYSIS AND BIO STATISTICS

Paper-VI-C1

(MODEL QUESTION PAPER)

Time: 2 1/2hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions from the following: **5 x4 = 20M**

1. **Explain** Meaning and objectives of Survival analysis
2. **Explain** origin of Bio-statistics
3. **Describe** Survival Distribution and its applications
4. **What** are type-1 and types-II errors
5. **Explain** Competing risk theory
6. **Write** stochastic epidemic models
7. **Explain** Phase I,II and III trails
8. **Discuss** about General Models

SECTION-B

Answer any THREE questions from the following: **3x10 = 30M**

9. **Explain** Exponential and gamma Distribution
10. **Explain** weilbull, Lognormal and their density functions
11. **Explain** Progressive or random censoring with biological examples
12. **Explain** Estimation of probabilities of death using maximum likelihood principle
13. **Discuss** about Statistical Genetics

	Government College (Autonomous) Rajahmundry	Program & Semester III B.Sc. (VI Sem) PAPER-VII			
Course Code SAS109	**TITLE OF THE COURSE ACTUARIAL APPLICATIONS**				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites:	To have knowledge in Mathematics and Statistics and Insurances		6	0	3

CourseObjectives:

The Objective of this course is to

1. Gain knowledge about insurance and its features

2 study about life tables and its uses in estimating the survival rate or mortalityrates

3. know about various types of insurances and their benefits

CourseOutcomes:

On Completion of thecourse, the students will be able to-	
CO1	Understand the **Multiple Decrement Model**
CO2	Work on **Application of multiple decrement theory**
CO3	Work on **Profit testing**
CO4	Calculate the commutation function
CO5	Calculate amount of **Pension funds**

Course with focus on employability / entrepreneurship / Skill Development modules

Skill Development		Employability		Entrepreneurship	

Syllabus:

Unit:1 Multiple Decrement Model

Two random variables, Random Survivorship Group, Deterministic Survivorship Group, Associated single Decrement tables: Basic Relationship, Uniform Distribution Assumption for multiple decrements, Construction of

Multiple decrement table, Relationship between single and multiple decrement tables.

Unit:2 Application of multiple decrement theory

Actuarial present value and their numerical evaluation, benefit premium and reserves, competing risks, multiple state modelling, multiple state Markov model,Kolmogorov forward equations, multiple decrement tables.

Unit:3 Profit testing-I

Discounted emerging costs, unit-linked contract, Profit test annual premiumcontracts, the profit vector, the profit signature, the net present value and the profitmargin, determining premiums using profit test, Profit criterion.

Unit:4 Profit testing-II

Determining reserves using profit testing, Zeroizing negative cashflows, Equity-linked insurance, deterministic profit testing for equity linked insurance, Stochastic profit testing, Stochastic pricing, Stochastic reserving.

Unit:5 Pension funds

Multiple decrement service table for pensions calculations, updating a service table,the salary scale function, setting the DC contribution, the service table, fundingplans, valuation of benefits: Final salary plans, Career average earnings plans.

Text Books

1.Bowers, N. L., Gerber, H.U., Hickman, J.C., Jones, D.A., Nesbitt, C.L.(1986), Actuarial Mathematics, The society of actuaries.

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https://learn.filtered.com/blog/the-principles-of-modelling

CO-POMapping:

(1:Slight[Low]; 2:Moderate[Medium]; 3:Substantial[High], '-':No Correlation)

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CO2	2	2	1	3	2	3	2	3	2	1	3	2	1
CO3	3	1	2	1	2	3	1	3	12	2	2	3	1
CO4	2	3	3	3	2	3	2	3	3	2	2	2	2
CO5	2	2	3	2	3	2	2	1	1	2	2	2	1

Government College [A] Rajamahendravaram

CBCS SYLLABUS (Semester Wise) -2024-25

III B.Sc. Statistics/Semester-VI- Actuarial Science

ACTUARIAL APPLICATIONS Paper-VI-C2

(MODEL QUESTION PAPER)

Time: 2 1/2hrs **Max Marks: 50**

SECTION-A

Answer any FIVE questions from the following: **5 x4 = 20M**

1. **Write about** Random Survivorship Group
2. **Explain** Associated single Decrement tables
3. **Explain** Benefit premium and reserves
4. **Explain** multiple decrement tables
5. **Explain** Discounted emerging costs
6. **Write about** Equity-linked insurance
7. **Explain** Pension funds
8. **Explain** Funding plans

SECTION-B

Answer any THREE questions from the following: **3x10 = 30M**

9. **Explain** Multiple Decrement Model

10. **Explain** multiple state Markov model,Kolmogorov forward equations

11. **Explain** Stochastic profit testing, Stochastic pricing, Stochastic reserving

12. **Explain** net present value the profit margin,determining profit.

13. **Discuss** valuation of benefits: Final salary plans, Career average earnings plans.