# BAGALKOT UNIVERSITY, JAMKHANDI

**BACHELOR OF SCIENCE PROGRAMME**

**THE COURSE STRUCTURE & SYLLABUS**

**FOR**

**STATISTICS**

**III and IV Semesters**

w.e.f.

AcademicYear2025-26andOnwards Under

**STATE EDUCATION POLICY(SEP)**

# B.Sc. Program III Semester

| Category | Course Code | Title of the Paper | Marks | | | Teaching Hours Per Week | | | Credits | Duration of Exam |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IA | SEE | Total | L | T | P | | |
| L1 | --- | Language-I | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| L2 | --- | Language-II | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| Major | --- | Major Subject 1 | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | --- | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| Major | ---- | Major Subject 2 | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| Major | 2A3STAM03T | Theory of Sampling and Statistical Inference - I | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | 2A3STAM03L | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| CEC1 | 2A3STAE01T | Statistical Methods | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| | | **Total Marks** | | | **750** | **Semester Credits** | | | **24** | |

# B.Sc. Program IV Semester

| Category | Course Code | Title of the Paper | Marks | | | Teaching Hours Per Week | | | Credits | Duration of Exam |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | IA | SEE | Total | L | T | P | | |
| L3 | --- | Language-I | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| L4 | --- | Language-II | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| Major | --- | Major Subject 1 | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | --- | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| Major | ---- | Major Subject 2 | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| Major | 2A4STAM04T | Exact Sampling Distributions and Statistical Inference -II | 20 | 80 | 100 | 4 | -- | -- | 3 | 3 |
| | 2A4STAM04L | Practical | 10 | 40 | 50 | -- | -- | 4 | 2 | 3 |
| CEC2 | 2A4STAE02T | Population Studies | 20 | 80 | 100 | 3 | -- | -- | 3 | 3 |
| | 2A4STAS01T | Project | 10 | 40 | 50 | 1 | -- | 2 | 2 | 2 |
| | | **Total Marks** | | | **800** | **Semester Credits** | | | **26** | |

# B.Sc. Program III Semester

**B.Sc. Program with Statistics Major Subject**

(T:Theory ,P:Practical,DSC:Discipline Specific Course)

**Note: Duration of examinations is 03 Hrs for 80 Marks theory For practical'sdurationof examination is 03 Hrs.**

# Regulations and Syllabus

# For

# STATISTICS

# In

# Three Year B. Sc. Course (SEP2024)

**Regulation and Scheme of Instructions:**

Regulations for governing three years semesterized Bachelor degree Programmed of Bagalkot University, Jamkhandi in Statistics major subject with effect from academic year 2024-2025.

## I. Goals and Objectives:

Thefollowingaimshavebeenkeptinviewwhiledesigningthesyllabusof Bachelor'sprogramme (B.Sc.)in Statistics as one of the major subject.

1. To create an aptitude and bring statistical awareness among the students.
2. Totrainpromisinglearnerstoteach Statisticseffectivelyatvariouslevelintheeducational Institutions.
3. Toprovideadequate Statisticalknowledgeandskillsasrequiredforthecompetitive examination.
4. To enrich and enhancing lyrical skill through Statistical techniques.
5. To make the subject student friendly , social lyre Levant and to cultivator search culture among the students.

## II. Admission criteria:

Any candidate who have passed PUC/10+2 with any subjects are eligible to choose Statistics as one of the major subject at the under graduate course. The other rules for admission are as per the university and government notifications from time to time.

## III. Medium of Instruction:

The medium of instruction will be in English.

## IV. Attendance:

A minimum of 75% of attendance in each semester is compulsory.

## V. Scheme of Instruction:

1. TheM.A/M.Sc./M.Stat.MasterdegreeholdersinStatisticscanonlyteachStatistics major subject at UG level.
2. StatisticsisanmajorsubjectatUGlevelwhichconsistsofsixsemesters.Therewillbeone theory paper for 100 marks and one practical paper for 50 marks each semester. The durationofteachinghourswillbe4hoursperweekfortheorypaperand4horsforpractical.

## VI. General Pattern of Theory Question Paper:

1. Theory course shall carry 100 marks of which 80 marks allotted for semester end examination and 20 marks for internal assessment.
2. Practicalshallcarry50marksofwhich40marksallottedforsemesterendexaminationand 10 marks for practical internal.

# B.SC.SEMESTER III

**COURSE CODE 2A3STAM03T**

**COURSE TITLE: THEORY OF SAMPLING AND STATISTICAL INFERENCE - I**

**MAX.MARKS:100(SEC-80+ IA– 20)** **Credits: 3**

**TeachingHours:52Hours** **Workload:04Hrs/Week**

**Course Outcomes(COs):At the end of the course students will be able to:**

**CO1:** Understand the principles under lying sampling as a means of making in references about a population.

**CO2:**Underst and the difference between probability and non probability sampling.

**CO3:** Understand different sampling techniques.

**CO4**: To learn toes tomato population parameters from a sample.

**CO5:** To find estimators using different methods of estimation and compares timat ors.

**CO6:** To carry out statistical inference using different tests of hypotheses under different cenarios.

**CO7:**To carry out the intervals timation to know the probably range of the parameters.

| Unit | | 52hrs/ sem |
|---|---|---|
| Unit I | **Introduction to Sampling ,and Simple Random Sampling:** Concept of population and Sample. Need for sampling, Complete Enumeration versus Sample Surveys, Merits and Demerits, Non – Probability and Probability Sampling, Need and illustrations. Use of randomnumbers,Principalstepsinsamplesurvey.Requisitesofagoodquestionnaire.Pilot surveys,Samplingandnon–samplingerrors,DescriptionofSRS,simplerandomsampling according to with and without replacement procedures, Unbiased estimates of population mean and totals, Derivation of sampling variances, standard errors of estimators, Simple random sampling for proportions, derivation of variances of estimators and their estimation ,determination of samplesize for estimation of population mean and population proportion, Merits and demerits of Simple random sampling. | 13hrs |
| Unit II | **Stratifiedsamplingandsystematicsampling:**Stratificationanditsbenefits;basis of stratification, Technique, estimates of population mean and total, variances of these estimates,proportional,optimumallocations,Neyman'sallocation,allocationwithcost functionsandtheircomparisonwithSRS.Practicaldifficultiesinallocation,derivation | 13hrs |

| | | |
|---|---|---|
| | Of the expressions for the standard errors of the above estimate or when the seal locations are used, estimation of gain in precision, post stratification and its performance. Systematic Sampling: Linear systematic sampling Technique; estimates of population mean and total, variances of these estimates (N=n x k). Comparison of systematic sampling with SRS and stratified sampling in the presence of linear trend and Corrections. | |
| Unit III | **Point Estimation:** Concepts of the terms: Parameter, Estimator, Estimate and Standard Error of an estimator. Unbiasedness, Mean squared error as a criterion for comparing estimators. Relative efficiency, Most efficient estimator, Minimum variance unbiased estimator (MVUE). Consistency: Definition and criteria for consistency. Proof of Sufficient condition for consistency using Chebyshev's in equality.Sufficientstatistic, Fisher – Neyman criterion and Neyman–Factorization theorem (without proof), Measure of information – Fisher information function. Cramer–Rao inequality (with proof) and its applications in the construction of minimum variance unbiased estimators. Methods of Estimation: Maximum Likelihood and Moment estimation methods. Standard examples from theoretical distributions, Illustration for non uniquenessofMLE's.PropertiesofMLEstimatorandMMEstimator.Examples Illustrating properties of MLE. | 13hrs |
| Unit IV | **Order Statistics:** Definition of ordered statistic and their distributions, Derivation of firs to ruder statistic, higher stored statistic, rthorder statistics, joint distribution of order statistics and their derivations, simple examples to obtain the distributions of order statistics.<br>**Interval Estimation:**, Confidence interval based on pivotal quantity. Confidence coefficient. Confidence intervals for mean, difference between means for large and small samples, Confidence intervals for variance and ratioofvari ancesunder normality. Large sample confidence intervals for<br>Proportion and difference between two proportions and correlation coefficient. | 13hrs |

**Recommended books:**


1. Cochran,W.G.(1977).SamplingTechniques.WileyEasternLtd.,NewDelhi.
2. Goon,A.M.,Gupta,M.K.andDasgupta,B.:FundamentalsofStatisticsVolumeIandII.The World Press Private Limited, Calcutta.
3. Gupta, S.C.andKapoor,V.K.:FundamentalsofMathematicalStatistics,SultanChand&Sons, New Delhi.
4. Gupta,S.C.:FundamentalsofStatistics,HimalayaPublishingHouse,Bombay.
5. KalyanKumarMukherjee:Probability andStatistics,NewCentralBookAgency(P)Ltd.,Calcutta.
6. Lindgren:IntroductiontoProbability&Statistics,MacMillanPublishers.
7. Mukhopadhaya,P.(1996).MathematicalStatistics.NewCentralBookAgency(P)Ltd.,Calcutta.
8. R.V.Hogg, E. A.Tannis, Probability and Statistical Inference: Third Edition; Collier McMillan Publishers.
9. RobertV.HoggandAllenT.Craig:IntroductiontoMathematicalStatistics(FifthEdition), Pearson Education Inc, New Delhi.
10. Rohatgi,V.KandSaleh,A.K.MD.(2001).*AnIntroductiontoProbabilityandStatistics,*2nd edition. John Wiley & Sons, Inc., New York


**COURSETITLE:PRACTICALS**
**COURSECODE 2A3STAM03L**

1. Toselectasimplerandomsamplingwithandwithoutreplacementprocedurefrom afinite population sing Random Number Tables.
2. Problems on Simple Random Sampling.
3. Problems on Stratified Random Sampling.
4. Problems on Systematic Random Sampling.
5. Computation of mean square errors of estimators and comparison.
6. Problems on Maximum Likelihood Estimation.
7. Problems on Method of Moment Estimation.
8. Construction of Confidence Intervals for single mean and difference of two means.
9. Construction of Confidence Intervals for single proportion and difference of two proportions.
10. ConstructionofConfidenceIntervals–forsinglevarianceandratiooftwovariances.

# B.SC.SEMESTER IV

**COURSE CODE 2A3STAM04T**

**COURSE TITLE: EXACTSAMPLINGDISTRIBUTIONSANDSTATISTICALINFERENCE-II**

**MAX.MARKS:100(SEC-80+ IA– 20)** **Credits: 3**

**TeachingHours:52Hours** **Workload:04Hrs/Week**

**Course Out comes(COs)**

Attheend of the course the student should be able to:

1. To understand and derive theChi-square, t,and F distributions, along with the irproperties,moments, and interrelationships, and apply them to theoretical and practical examples.
2. To comprehend the fundamentals of hypothesis testing, including critical concepts like Type I and II errors,power,andlevelofsignificance,andapplystandardlargesampletests($Z,\chi^2$,t,F)torealdata.
3. To formulate and conduct Likelihood Ratio Tests (LRT) and verify Monotone Likelihood Ratio (MLR) properties for deriving UMP tests in one-parameter families.
4. To demonstrate the need for non-parametric tests, differentiate them from parametric tests, and apply various non-parametric tests such as the Sign test, Wilcoxon signed-rank test, Kolmogorov-Smirnov test, Runs test, Mann-Whitney test, and others for different hypotheses and data structures.

| Unit | | 52hrs/ sem |
|---|---|---|
| Unit I | **Chi-Square, t and F Sampling Distributions**: Chi-square Distribution: Definition, Derivation of Chi-distribution by Moment Generating Function method, Properties, Moments, Recurrence relation for moments about origin and mean, limiting form of Chi- distribution. Independence of sample mean and sample variance in random sampling from a normal distribution, Theoreticalexamples,Definitionofstudentst–variateandFisher'st–variate, Derivation of students t – distribution, Moments and Recurrence relation for t – distribution, Limiting form of t – distribution, Theoretical examples. Snedecor's F – distribution: Definition, Derivation of F - distribution, Properties,Momentsandrecurrencerelationformoments,Interrelationship betweent, Fand$\chi^2$ distributions, Theoreticalexamples. | 13hrs |

| | | |
|---|---|---|
| Unit II | **Tests of Significance and Testing of Hypothesis**: Definitions of some important terms: Statistical Hypothesis, Simple & Composite, Null and Alternative hypothesis, Critical Region, Type I and Type II errors, Level of Significance,PowerfunctionandPowerofthetest,OnetailedandTwotailed tests, Z test, Large sample test for mean and difference of means, Proportion and difference of proportions. Applications of $\chi^2$ , t and F distributions, Definitions of Most powerful test, Uniformly most powerful test. Statement and proof of Neyman-Pearson Lemma and itsusein the construction of most powerful test, Standard examples for computation of Type I and Type II errors and Power of the test. Standard examples for NP lemma to determine most powerful Critical Region for one sided and two sided alternatives,<br>And for Power Curves. Idea of randomized and non –randomized tests and critical function. | 13hrs |
| UnitIII | **Likelihood Ratio Test & MLR property**: Likelihood ratio tests (LRT).Large sample approximations to the distribution of the likelihood ratio statistics (without proof). LRT for single mean for normal case (large and small samples). Definition of a monotone likelihood ratio property, verification of the property for some standard distributions for existence of one sided UMP tests.<br>**Sequential Testing**: Need for sequential tests, Wald's SPRT, Graphical procedure of SPRT, Determination of stopping bounds, Construction of SPRT of strength $(\alpha, \beta)$ for Binomial, Poisson, Normal and Exponential distributions. Approximate expressions for OC and AS N functions for Binomial, Poisson and Normal distributions. Difference between SPRTand NP-test. Merits and demerits of SPRT. | 13hrs |

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|---|---|---|
| Unit IV | **Non –Parametric tests**: Need for Non-Parametric Tests, Advantages and Dis-advantage of non-parametric methods over parametric methods. Assumptions in non-parametric methods. Sign test for quintiles, Sign test based on paired observations, Wilcox on signed rank test for one sample and paired samples. Comparison of the sign-test and Wilcox on signed– rank test, Kolmogorov – Smirnov one-sample test, Comparison of it with chi-square test, Wald-Wolfowitz runs test, Median test and Mann-Whitney-Wilcoxon –test for two sample problems, Runtestforr and omens', Testforin dependence based on Spearman'srankcorrelationcoefficient. | 13hrs |

**Recommended books:**


1. AbrahamWald:SequentialAnalysis,JohnWiley&Sons,NewYork.
2. Goon,A.M.,Gupta,M.K.and Dasgupta,B.:Fundamentalsof StatisticsVolumeIandII. The World Press Private Limited, Calcutta.
3. Gupta,S.C.andKapoor,V.K.:FundamentalsofMathematicalStatistics,SultanChand&Sons, New Delhi.
4. Randles,R.H. andWolfe,D.A.:IntroductiontotheTheoryofNon-parametricStatistics, John Wiley & Sons, New York.
5. Ray&Sharma: MathematicalStatistics,RamPrasad&Sons,Agra.
6. RobertV.HoggandAllenT.Craig:IntroductiontoMathematicalStatistics(FifthEdition), Pearson Education Inc, New Delhi.
7. 
8. Rohatgi, V.K.: An Introduction to Probability Theory and Mathematical Statistics, Wiley Eastern Ltd., New Delhi.
9. SidneySiegel: NonparametricStatistics, forbehavioral sciences, International Student Edition, McGraw Hill Ltd, India.

**COURSETITLE:PRACTICALS COURSE**

**CODE: 2A4STAM04L**

1. Applications ofChi-squaredistribution-testforvarianceandindependenceofattributesand Goodness of fit.
2. Applications of Students–distribution.
3. Applications of Snedecor's F–distribution
4. Large Sample Tests formed an and difference of means.
5. Large Sample Tests for proportion and difference of proportions.
6. Testing of Statistical Hypothesis-I–Problems on computation of Type I, Type II errors and power function.
7. TestingofStatisticalHypothesis-II–ComputationofMostpowerfultestsandPowercurves.
8. SequentialProbabilityRatioTestfordiscreteandContinuousdistributions.
9. Non– Parametric Tests for single sample (signtest, wilcoxonsigned rank test), Randomness test, Kolmogorov- Smirnov goodness of fit.
10. Non–ParametricTestsfortwoindependentsamples(signtest,wilcoxonsignedranktest ,mediantest,wilcoxonmann-whitneytest),Runtest,RankCorrelationCoefficient.

## CEC1:Statistical Methods(Elective)

**Course Out comes (CO)**

**Upon the completion of this course students should be able to:**

**CO1.Frame and formulate management decision problems.**

**CO2.Understand the basic once ptsunderlyingquantitative analysis.**

**CO3. Use sound judgment in the applications of quantitative methods to management decisions.**

**COURSECODE:2A3 STAE01T**

**CEC1: STATISTICAL METHODS**

**MAX. MARKS:100(SEC-80+IA–20)** **Credits:3**

**TeachingHours:40 Hours** **Workload:03Hrs/Week**

| **Unit I: Correlation** | **10hrs** |
|---|---|
| CorrelationAnalysis:MeaningofCorrelation:simple,multipleandpartial;linearand non-linear, Correlation and Causation, Scatter diagram, Pearson's co-efficient of correlation;calculationandproperties(Proofnotrequired).CorrelationandProbable error; Rank Correlation. | |
| **Unit II: Regression Analysis** | **10 hrs** |
| Regression Analysis: Principle of least squares and regression lines, Regression equations and estimation; Properties of regression oefficients;Relationshipbetween CorrelationandRegressioncoefficients;StandardErrorofEstimateanditsusein interpretingthe results. | |
| **Unit III:Index Numbers** | **10hrs** |
| Definition, Problems involved in the construction of index numbers, methods of constructing index numbers of prices and quantities, simple aggregate and pricier lattices method, weighted greater and weighted average of relatives method, important types ofweightedindexnumbers:Laspeyre's,Paasche's,Bowley's,Marshall-Edgeworth, Fisher's,methodofobtainingpriceandquantityindexnumbers,testsconsistencyof | |

| | |
|---|---|
| index numbers, time reversal test and factor reversal test for index numbers, Uses and limitationsofindexnumbers.Consumerpriceindexnumber:Problemsinvolvedinthe construction of cost of living index number, advantages and disadvantages, Aggregative expenditure method and Family budget method for the construction of consumerpriceindexnumbers.ApplicationsofCostofLivingIndexnumbers. Definition and measurementofInflation rate–CPIandGNPDeflator. | |
| **UnitIV:TimeSeriesAnalysis** | **10hrs** |
| Introduction, definition and components of Time series, illustrations, Additive, Multiplicativeandmixedmodels,analysisoftimeseries,methodsofstudyingtimeseries: Secular trend, method of moving averages, least squares method – linear, quadratic, exponential trend fittings to the data. Seasonal variation - definition, illustrations, measurements, simple average method, ratio to moving average method, ratio of trend method,linkrelativesmethod,Cyclicalvariation-definition,distinctionfromseasonal variation, Irregularvariation-definition, illustrations. | |

***References***


1. Levin,Richard,DavidS.Rubin,SanjayRastogi,andHMSiddiqui. Statistics for Management. 7th ed., Pearson Education.
2. David M. Levine, Mark L. Berenson, Timothy C. Krehbiel, P. K.Viswanathan, Business Statistics: A First Course, Pearson Education.
3. SiegelAndrewF.PracticalBusinessStatistics.McGrawHillEducation.
4. Gupta,S.P.,andArchanaAgarwal.Business Statistics,Sultan ChandandSons,NewDelhi.
5. VohraN.D.,BusinessStatistics,McGrawHillEducation.
6. MurrayRSpiegel,LarryJ.Stephens,NarinderKumar.Statistics(Schaum's Outline Series), Mc-Graw Hill Education.
7. Gupta,S.C.FundamentalsofStatistics.HimalayaPublishingHouse.
8. Anderson,Sweeney,andWilliams,StatisticsforStudentsofEconomicsandBusiness, Cengage Learning.

## CEC2:POPULATION STUDIES (Elective)

After recompletion of course, students will be able to:

**CO1:** Study the concepts of Vital Statistics, sources of data, different measures of Fertility, Mortality and migration.

**CO2:** Understand the Growth hates-GRR and NRR and their interpretations.

### COURSE CODE: 2A4 STAE02T

### CEC2: POPULATION STUDIES

**MAX. MARKS:100(SEC-80+IA–20)** **Credits:3**

**Teaching Hours: 40 Hours** **Workload:03 Hrs/Week**

| **Unit-I Introduction and Sources of Population Data** | **10hrs** |
|---|---|
| History, definition, nature and scope of population Studies. Sources of population data – salient features of Census, Civil Registration System, National Sample Surveys, Demographic Surveys, relative merits and demerits of these sources. Coverage and content errors. Use of balancing equations, Chandrasekar-Deming formula to check completeness of vital registration data, use of Whipple's, Myer's and UN indices. | |
| **Unit-II Fertility** | **10hrs** |
| Basicconceptsandtermsusedinthestudyoffertility.Measuresoffertility-CrudeBirth Rate (CBR), General Fertility Rate (GFR), Age Specific Fertility Rate (ASFR), Total Fertility Rate (TFR),Birthorderstatistics,ChildWomenratio.Measuresofreproduction-Gross Reproduction Rate (GRR)and Net Reproduction rate(NRR). Measurement of population growth rate- simple growth rate and compound growth. | |
| **Unit III Mortality** | **10 hrs** |
| Basic concepts and terms used in the study of mortality. Measures of mortality- Crude Death Rate (CDR), Age Specific Death Rate (ASDR), Direct and Indirect Standardized Deathrates,InfantMortalityRate(IMR),Under-fivemortalityRate,Neo-natal mortalityrate,Post-natalmortalityrate;MaternalMortalityRate(MMR). | |
| **Unit-III Lifetables and opulation change** | **10hrs** |
| Life tables: Components of a life table, force of mortality and expectation of life table, types of life tables. Construction of life tables using Reed-Merrell's method, Goreville's method. Uses of life tables.<br>Basic concepts and definition of population change, migration. Types of migration-internal and international, factors affecting migration. Rates and ratios of Migration-Indirectmeasuresofnet-internalmigration,nationalgrowthratemethod,residual method, push-pull factors Population estimates and projections. | |

Books recommended.


1. Barclay,G,W(1968).TechniquesofPopulationAnalysis,JohnWileyandSons,Incs. New York/London.
2. Keyfitz,H(1968). IntroductiontotheMathematicsofPopulation.Addison-WesleyPublishingCo.
3. Pathak,K.B andRam,F(1991).TechniquesofDemographicAnalysis,Himalaya PublishingHouse.
4. Ramakumar.R(1986).Technical Demography,Wiley EasternLtd.
5. Srinivasan.K(1998).BasicDemographicTechniquesandApplications,SagePublication, New Delhi.
6. WunschG.J.&M.G.Tarmota(1978).Introduction to Demographic Analysis,PlenumPress,N.Y.

## Practical Examination

Duration:3Hrs

- Practical Examination -30 Marks
- Viva Voce -05 Marks
- Record /Journal -05 Marks

**Total -40 Marks**

## Internal Assessment for PracticalPaper

- Attendance - 05 Marks
- Test - 05 Marks

**Total - 10 Marks**

# QuestionPaperPatterninStatistics(Major)forallsemester

1. Answerany**10**questionsoutof**12**questions(Q.No.1to12)

10x2=20Marks.

2. a)

   b) (5+10=15)

OR

   a)

   b) (5+10= 15)

3. a)

   b) (5+10=15)

OR

   a)

   b) (5+10= 15)

4. a)

   b) (5+10= 15)

OR

   a)

   b) (5+10= 15)

5. a)

   b) (5+10 =15)

OR

   a)

   b) (5+10 =15)

**Total=80marks**