

Syllabus for the Assistant Conservator of Forest

COMPULSORY SUBJECTS

- 1.) General Knowledge
- 2.) General English (Essay & Precise writing etc)
- 3.) Mathematics [Secondary/Matriculation or equivalent Standards)
- 4.) Optional subjects [2 subjects carrying 200 marks each]->CSE and STATISTICS
- 5.) Viva-Voce

- 1.) 100 marks
 - 2.) 100 marks
 - 3.) 100 marks
 - 4.) 400 marks
 - 5.) 80 marks
- Total 780 marks

GENERAL KNOWLEDGE:

- The paper on general knowledge will include question covering current event of national and international importance, history of India including that of North-East with Special reference to Arunachal Pradesh, Indian Freedom Movement, and Constitutions of India.
- General appreciation and understanding of science including everyday matter of observation and experience as may be expected of well-educated person.
- Geography of nature, Political System including local self-government in Arunachal Pradesh and Indian Economy.

GENERAL ENGLISH:

- Essay, precise writing.
- Letter Writing, Usages,
- Vocabulary and application of grammar.

MATHEMATICS:

- Including syllabus for Secondary, Matriculation or equivalent standard of recognized University or Board.
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OPTIONAL SUBJECTS

1.) COMPUTER SCI. AND ENGINEERING:

Section_A

1. Electronics:

- Solid State device-physics,
- characteristic and model logic families- DTL, RTL,TTL, cMOS, Nmos,
- logic design
- Binary arithmetic,
- Number system,
- Codes Boolean algebra
- circuit memorization,
- combinational circuits,
- synchronous sequential circuits,
- Asynchronous sequential circuits
- flip flops,
- counter and shift register
- karnaugh map,
- encoder, decoder,
- multiplexer, demultiplexcr, etc.

2. Computer programming and Data structures:

- Programming in FORTRAN, PASCAL and C, syntax and semantics, variables.
- Control Flow, Arithmetic and Boolean expression,
- struclural programming, Sub-programming, Algorithms.
- Array
- Stack,
- Queue,
- Linked lists,
- Tree,
- B-tree traversal.
- Internal sorting techniques,
- object oriented programming.

3. Microprocessor:

- Organisation and programming of 8 bit microprocessors, microcessor support chips(PPL, PIC DMA controller etc.)
- interacting memory and I/O devices,
- microprocessor development tools,
- microprocessor based system design.
- Introduction to 16 and 32 bit microprocessors,
- 8085 and 8086 microprocessors.

4. System Software:

- Microprocessor and assemblers,
- linker,
- loader,
- monitor,
- editor,
- reallocation,
- reentrant routine,
- co-routine.

Section_B

1.) Computer ARchitecture:

- Micro instructions,
- memory organization, cache memory virtual memory,
- stack array processor, pipeline processor, interconnection scheme for parallel processing.
- data flow machines,
- Internal structure of RAM, ROM, PAL, and DRAM, SCSI Hard disk, CISC & RISC m/cs. **2.) Operating**

System:

- Function and Component of OS,
- Batch processing ,
- time-sharing Device drive.
- Device drive,
- File system.
- Process scheduling,
- concurrent processes,
- memory management
- Swapping
- segmentation and paging
- virtual memory,
- disk scheduling,
- deadlock,
- case study of DOS and UNIX

3.) Compiler Design Programming Languages:

- Lexical analysis,
- grammar,
- syntax analysis,
- top-down and bottom-up parsing.
- semantic analysis,
- symbol table,
- error detection and recovery,
- code generation and an Optimization
- Data abstraction,

- Design philosophy of Pascal, functions.
- NFA.
- Study compiler Design tools(e.g Y ACC)

4.) Data Processing:

- File organization techniques,
- performance of sequential,
- indexed sequential.
- hashed inverted and multiring files,
- DBMS, relational data model.
- integrity constraints,
- relational algebra,
- relgebra,
- relational calculus,
- normalization
- concurrency control.

5.) Computer Graphics:

- Graphics I/O devices,
- Display adapters
- CGA, EGA. VGA,
- 2D-line and curve drawing
- 2D transformation windowing,
- curves of 3D modeling transformation,
- 3D viewing,
- Hidden line and surface removal ,
- Shading device independent graphics system

2.) STATISTICS:

Probability:

- Random experiments,
- sample space,
- event,
- algebra of events.
- probability on a discrete sample space,
- basis theorems of probability and simple examples bases the conditional probability of an event
- independent events,
- Baye's theorem and its application,

- discrete and continuous random variables and their distributions,
- expectation,
- moments,
- moment generating function,
- joint distribution of two or more random variables,
- marginal and conditional distributions,
- independence of random variables,
- covariance, correlation coefficient,
- distribution of a function of random variables,
- Bernoulli binomial, geometric negative binomial, hyper geometric, poisoning, multinomial, uniform. data, exponential, gamma
- Cauchy, normal, lognormal and bivariate normal distributions, real-life situations where these distributions provide appropriate models,
- Chebyshev's inequality, weak law of large numbers and **central limit theorem** for independent and identically distributed random variables with finite variance and their simple applications.

Statistical methods:

- Concept of a statistical populations and a sample,
- types of data, presentation and summarization of data
- measures of central tendency,
- dispersion skewness and kurtosis measures of association and contingency,
- correlation, rank correlation.
- Intra-class correlation, correlation ratio,
- simple and multiple linear regression,
- multiple and partial correlations (involving three variables only),
- Curve-fitting and principle of least squares,
- Concepts of random sample, parameter and statistic,
- **Z, X²-test** and **F** statistics and their properties and applications,
- distributions of sample range and
- Median (for continuous distribution only),
- Censored sampling (concept and illustrations)

Statistical Inference: Unbiasedness, consistency, efficiency, sufficiency, completeness, minimum variance unbiased estimation, Rao's Blackwell theorem, Lehmann-Scheffe theorem, Cramer-Rao's inequality and minimum chi-square. methods of estimation, properties of maximum likelihood and other estimators. idea of random interval, confidence intervals for the parameters of standard distributions, shortest confidence intervals, large sample confidence intervals.

Simple and composite hypotheses, two kinds of errors, level of significance, size and power of a test desirable properties of a good test, most powerful test, Neyman Pearson lemma and its use in simple

examples, uniformly most powerful test likelihood ratio test and its properties and applications.

- ***Chi-square test***, sign test, Wald-Wolfowitz run test, run test for randomness medium test Wilcoxon-Mann-Whitney test
- ***Waller's sequential probability ratio test***,
- OC and ASN functions application to binomial regression methods of estimation under simple and stratified random sampling, double sampling for ratio and regression methods of estimation,
- two stage sampling with equal size first stage units.
- Analysis of variance with equal number of observation per cell in one,
- two and three way classifications,
- analysis of covariance in one and two way classifications
- basis principles of experimental designs,
- completely randomized design,
- randomized block design
- Latin square design,
- missing plot technique 2nd factorial design,
- total and partial confounding,
- 32 fractional experiments,
- splitplot design and balanced incomplete block design.

Optimization Techniques:

- Different types of models in operational research,
- their construction and general methods of solution,
- simulation and Monte-Carlo methods,
- the structure and formulation of linear programming(LP)problem,
- simple LP model and its graphical solution,
- the simplex procedure,
- the two-phase method and the M-technique with artificial variables,
- the duality theory of LP and its economic interpretation.
- Sensitivity analysis,
- transformation and assignment problems,

- rectangular games, two person zero-sum games,
- methods of solution(Graphical and algebraic).

Replacement of failing or deteriorating items,

- group and individual replacement policies,
- concept of scientific inventory management and analytical structure of inventory problems,
- simple methods with deterministic and stochastic demand with and without lead time,
- storage models with particular reference to dam type.

Homogeneous discrete-time Markov chains,

- transition probability matrix,
 - classification of states and ergodic theorems,
 - homogeneous continuous time Markov chains,
 - Poisson process,
 - elements queuing theory M/M/I,M/M/K,G/M/I and M/GI queues.
 - Solution of statistical problems on computers using well known statistical software packages like **SPSS**(IBM SPSS).
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