MIZORAM PUBLIC SERVICE COMMISSION

General Competitive Examinations for Recruitment to the post of Junior Grade of Mizoram Forest Service i.e. Assistant Conservation of Forest (ACF) under Environment, Forest & Climate Change Department, Government of Mizoram, 2018

STATISTICS

Time Allowed : 3 hours | Full Marks : 100

The figures in the margin indicate full marks for the questions.

Answer any 10 (ten) questions taking 5 (five) questions from each section.

SECTION - A

1. Define classical, statistical and axiomatic definitions of probability giving limitations of each, if any. **(10)**

2. Define mathematical expectation with suitable example. State and prove the addition theorem of expectation. **(4+6=10)**

3. State and prove Chebychev's inequality and hence determine how many times a fair coin must be tossed in order that the probability will be at least 0.95 that the ratio of the observed number of heads to the number of tosses will lie between 0.4 and 0.6. **(6+4=10)**

4. Show how can one estimate population total and its variance? **(10)**

5. Write the set of orthogonal contrasts for main effects and interaction in (i) 2^2 factorial, and (ii) 2^3 factorial. **(4+6=10)**

6. State and prove Crammer Rao inequality stating clearly the underlying regularity conditions. **(10)**

7. What are principal components? State their uses. Point out similarities and dissimilarities between principal component analysis and factor analysis. **(3+3+4=10)**

SECTION - B

8. What do you mean by statistical quality control chart for fraction defective? Show how you can set the control limits for R-charts in statistical quality control. **(5+5=10)**

9. Describe single sampling plan and its advantages and explain the following points in it: (i) producer's risk, (ii) consumer's risk, and (iii) (AOQL). **(4+6=10)**

10. What do you mean by a feasible solution and a non-degenerate feasible solution of a linear programming problem? Show how you will solve a linear programming graphically using suitable example. **(4+6=10)**

11. What do you mean by Markov chain? Give suitable example. Explain the higher order transition probabilities. **(3+2+5=10)**

12. How do you understand by the index of industrial production? Show how can one find out the indices by the chain-base method? **(5+5=10)**

13. On what assumptions are the constructions of life table based? Describe the various uses of life-table.

14. What is a time series? Describe the ratio to moving average method for the measurement of seasonal indices. Also give its merits and demerits. **(2+5+3=10)**

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