:: Research Methodology & Medical Statistics: **(50 Marks)**

Section A

1. One compulsory question   5 marks

2. Answer any 3 out of 5 questions, of 5 marks each   15 marks

3. Answer any 5 out of 6 questions, of 2 marks each   10 marks

Section B

4. One compulsory question   5 marks

5. Answer any 1 out of 2 question   5 marks

6. Answer any 5 out of 6 question, of 2 marks each   10 marks

SYLLABUS

PART – A
Research Methodology   **(30 Marks)**

1. Brief historical background of research in Ayurved and contemporary medical science Evidences of researches in ayurvedic classics

2. Etymology, definitions and synonyms (Anveshana, Gaveshana, Prayeshana, Anusandhan and Shodha) of the word Research

3. Research in Ayurved - Scope, need, importance, utility

4. Types of Research (familiarization of the terms)

   a) Pure and Applied

   b) Qualitative, Quantitative and Mixed Observational and interventional.

5. Research process (Importance of each steps in brief)

   a. Selection of the topic

   b. Review of the literature

   c. Formulation of Hypothesis

   d. Aims and Objectives

   e. Materials and methods

   f. Observations and results

   g. Methods of communication of Research

6. Research tools – Role of the pramanas as research tools

7. The concept and importance of ethics in research

8. Concept of Evidenvce Based Medicine and Scientific Writing

9. Importance of IT in data mining and important research data portalsconcerned with Ayurved and contemporary medical science (DHARA , PubMed, Ayush Research Portal, Bioinformatics Center, Research Management Informatic System etc.)

RESEARCH METHODOLOGY & MEDICAL STATISTICS

Part A   **30 Marks**

5 marks Questions

1. Write the history of research in Ayurved?

2. Define and Mention etymology Anveshana.

3. Define and Mention etymology Gaveshana.

4. Define and Mention etymology Prayeshana

5. Define and Mention etymology Anusadhan

6. Define and Mention etymology Shodha

7. What do you mean by Pramana? What are its types and explain any one Pramana?

8. What do you mean by Anusandhan? Write its classification and importance.

9. Explain: research in Ayurveda.

10. Write the scope of research in Ayurved?

    [What are scopes of research in Ayurved?]

11. Why is research needed in Ayurved?

12. Explain the utilities of research in Ayurved.

13. What are type of research? Explain it.

14. Explain the pure Research (fundamental research ,basic research)

15. Explain the applied Research.

16. Explain the descriptive research.

17. Explain the analytical research.

18. Explain the quantitative research.

19. Explain the qualitative research.

20. Explain the mixed research.

21. Explain the experimental research.

22. Explain non experimental research.

23. Write the type of non experimental research.

24. Explain primary research.

25. Explain secondary research.

26. Explain observational research.

27. Explain interventional research.

28. What are differences between qualitative and quantitative research?

29. What are merits and demerits of mixed research?

30. What do you mean by observation in research?

31. What are the type of observation and how they are linked with potential issues of research?

32. What do you mean by observational and interventional study designs?

33. What are the types of observation study designs?

34. What are the types of interventional study designs?

35. What are preclinical and clinical research designs?

36. What do you mean by Research Problem?

37. What are steps for selection of topic for a research?

38. What do you mean by review of literature?

39. What is necessary of review of literature?

40. What is importance of review of literature?

41. What is hypothesis? What are Characteristics of hypothesis?

42. How the hypothesis is tested?

43. What is importance of hypothesis?

44. What do you mean by aims and objectives?

45. What are the characteristics of aims and objectives?

46. What are points to consider while writing aims and objectives?

47. What are the importance of aims and objectives?

48. What do you mean by material and method in a research?

49. What are steps to write materials and methods?

50. What are importance of materials and methods?

51. What is observation of research?

52. What are features of research?

53. What is result of research?

54. What are features of result?

55. How is an effective result written?

56. What are an effects in result of observation?

57. How is an effective observation written?

 58. What do you mean by communication of research? What are method of communication of research?

59. What are the role of the Pramanas as research tools?

60. Write about the role of various Pramanas as research tool.

61. What is concept of ethics in research?

62. What is importance of ethics in research?

63. What do you mean by IEC and explain it?

64. What is concept of evidence based medicine?

65. What are steps of EBM?

66. What are advantages and disadvantages of EBM?

67. What do you mean by scientific writing?

68. Write down the purpose of scientific writing?

69. Write down the basic structure of scientific writing?

70. Explain AIMRD.

71. What are importance of Information technology in data mining?

72. What do you mean by research data portal concerned with Ayurveda and contemporary medicine?

73. What are steps to search data using such portals?

74. Explain DHARA.

75. Explain Pubmed.

76. Explain AYUSH research Portal

77. Explain Bioinformatics center.

78. Explain research management informatics system.

RESEARCH METHODOLOGY & MEDICAL STATISTICS

Part A   **30 Marks**

2 marks Questions

1. What do you mean by Aptopadesha?

2. What do you mean by Pratyaksha Pramana?

3. What do you mean by Anumana Pramana?

4. What do you mean by Yukti Pramana?

5. What do you mean by Anveshana?

6. What do you mean by Gaveshna?

7. What do you mean by Anusandhan?

8. What do you mean by Prayeshana?

9. What do you mean by Shodha?

10. Define Research in Ayurved?

11. What is literary research?

12. What is fundamental research?

13. What is clinical research?

14. What is drug research?

15. What is yoga and astrology in relation to Ayurveda?

16. What is mean by Ecological study design?

17. What is mean by proportional mortality ration study design?

18. What is mean by cross –sectional study design?

19. What is mean by case –contral study design?

20. What is mean by retrospective and prospective cohort study design?

21. What is mean by diagnostic testing and evaluation study designs?

22. What is pre-post study design?

23. What is the meaning of RCT?

24. What is non-randomized trial study design?

25. What is Crossover randomized controlled trial study design?

26. What is the meaning of FINER?

27. What is the meaning of PICOT?

28. What is review of literature?

29. What is hypothesis?

30. What is objectives?

31. What Is materials?

32. What is methods?

33. What is Observations?

34. What is results?

35. What do you mean by communication of research?

36. What is research tools?

37. What is ethics in research?

38. What is the meaning of EBM ?

39. What is the meaning of AIMRD ?

40. What is the meaning of CERTEF?

41. What is the meaning of CRIS?

PART – B

Medical-Statistics   **(20Marks)**

1. Definition, scope and importance of the Medical statistics

2. Common statistical terms and notations

    a. Population

    b. Sample

    c. Data

    d. Variable

    e. Normal distribution

3. Collection and Presentation of data

    a. Tabular

    b. Graphical

    c. Diagrammatical

4. Measures of location

    a. Average

    b. Percentile

    Measures of Central Tendency

    a. Arithmetic mean

    b. Median

    c. Mode

5. Variability and its measurement

    a. Range

    b. Standard deviation

    c. Standard error

6. Introduction to probability and test of significance

7. Parametric and non parametric tests

8. Introduction to commonly used statistical soft-wares.

RESEARCH METHODOLOGY & MEDICAL STATISTICS

Part B   **20 Marks**

5 marks Questions

1. What is statistics? What are its characteristics?

2. What is medical statistics? Write the importance of medical statistics?

3. What is medical statistics? What are the scopes of medical statistics?

4. What are the functions of statistics? Write the enumerate limitations of statistics.

5. What are the differences between population and sample?

6. What do you mean by sample? Why do we use sample in statistics research?

7. What do you mean by sample? Write the main object of the sample.

8. What do you mean by data? Write the type of data.

9. What are the sources of data collection?

10. What are the methods of data collection?

11. What do you mean by variables? State its types.

12. State the difference between primary data & secondary data.

13. Explain the methods of collection of primary data.

14. Discuss the advantages & limitations of the method of direct inquiry of collecting primary data.

15. Discuss the advantages and limitations of the method of indirect inquiry of collecting primary data.

16. State the source of Secondary data.

17. What do you mean by data presentation? State its importance.

18. What do you mean by data presentations? Explain the types of Table.

19. State the advantages of classification of data.

20. State the uses of a table?

21. Explain the guiding rules for tabulation. What are requisites of good table?

22. Explain the different types of table.

23. What are the importance of diagrams & their limitation?

24. What are the importance of graphical presentation & their limitations?

25. What are the differences between diagrams &graphs?

26. What are general rule for constructing a diagrams?

27. Explain the type of diagrams.

28. Explain: -one dimensional diagrams

29. Explain:-two dimensional diagrams

30. Explain:-three dimensional diagrams

31. Explain:-pictogram

32. Explain:-cartogram

33. Explain:-frequency polygon

34. Explain:-Frequency curve

35. What is line diagram?–Discuss with example.

36. What do you mean by bar diagram? What are importants to draw a bar diagram?

37. What do you mean by two –dimensional diagrams? Explain their types.

38. Write down the steps for construction of pie-diagram.

39. What do you mean by Histogram? Explain Steps of construction.

40. What do you mean by measures of location and measures of dispersion?

41. Explain: - Mean

42. Explain: - Median

43. Explain:-Mode

44. Explain:-Geometric mean

45. Explain:-Harmonic mean

46. Explain:-percentile

47. State the characteristics of an ideal measure of central tendency

48. Define the mean and state its merits and demerits.

49. Define the median and state its merits and demerits.

50. Define the mode and state its merits and demerits.

51. Define the geometric mean and state its merits and demerits.

52. Define the percentile and state its merits and demerits.

53. What do you mean by measures of dispersion? Explain its characteristics.

54. What do you mean by range? Explain its merits and demerits

55. What do you mean by interquartile range? Explain its merits and demerits.

56. What do you mean by standard deviation? Explain its merits and demerits.

57. What do you mean by standard error of a statistics? Explain its uses.

58. Explain the concept of probability

    a) Mathematical [priori approach]

    b) Relative frequency [empirical approach]

    {Statistical definition}

59. Explain axiomatic probability.

60. Explain conditional probability.

61. Explain addition theory of probability.

62. Explain multiplication theory of probability.

63. Explain Bayes' theorem of probability.

64. What is normal distribution? Explain rough sketch, density, function & important properties.

65. What do you mean by significance levels?

66. What is hypothesis and describe its types.

67. What is test of a statistical hypothesis? Explain Errors.

68. What is Type –I error? What is Type –II error? How can be the risk of both of types of errors minimized?

69. What do you mean by parametric and non-parametric tests? Explain it.

70. What are the differences between parametric and non-parametric tests.

71. What are corresponding non parametric test relevant to parametric test.

72. Explain: - Karl person's coefficient correlation

73. Explain: - Wilcoxon rank –sum test

74. Explain: - Kruskal –Wallis test

75. Explain: - Wilcocon signed rank test

76. Explain: - Spearman's rank correlation coefficient

77. Explain: - Mc.Nemar's test

78. Explain: - Chi-square test

79. Explain: - T- test

80. Explain: - Z – test

81. Explain: - F – test

82. Define student's T statistics and density function.

83. What are types of T – tests? Explain it.

84. What are types of Z- tests? Explain it.

85. What are types of F-tests? Explain it.

86. What is ANOVA? Explain it.

87. What do you mean by statistical software? What are importance of statistical software?

Marks 5 / question (calculation)

88. The following data show the number of daily patients. Find the mean of numbers of patients.

   7, 13,4,3,8,6,9,6

89. Find the mean incubation period of 9 polio cases given below.
   23, 22, 20,24,16,17,18,19,20

90. Heights in centimeters for school children are given below

Heights	148	143	160	152	157	150	155
No of children	2	2	2	2	2	2	2

91. The mean weight of a group of 20 persons was found to be 55kg. Later it was discovered that the one of them reported his weight as 45kg which was actually 54kg. Find the correct mean of their weights.

92. The following table shows the number of children per family in a certain area. Find the mean number of children for family.

No of children	0	1	2	3	4	5
No of families	4	8	23	8	6	3

93. The height of 7 boys aged 14 years is given in cm with fraction in the series below. Find median
   145.8, 152.1, 153.6, 146.9, 148.8,150,157

94. The following table shows the record of absent students of class during a month. Find the median of absent days students.

No of absent days	0	1	2	3	4	5
No of student	8	12	18	9	5	1

95. The numbers of books purchased by each of the 15 persons from a book store are as follows. Find the mode.

$$1,0,2,2,3,4,2,7,2,2,5,4,2,1,2$$

96. The number of patients arriving at a clinic each hour during working hours of a day recorded as follows.

3,5,4,2,7,8,13

97. The following data show the heights of girls. Find the range

Heights (cm)	126	110	91	115	112	80	100	93	97	106

98. From following information of monthly Y expenditure of drog. find the range of expenditure

Monthly expenditure	3500	4000	5000	7500	10000	12000
No of person	3	21	30	19	6	5

99. In a survey of 200 boys of which 75 were intelligent and of them 40 had skilled fathers, while 85 of the unintelligent boys had unskilled fathers . Do these figures are consists.

100. Birth and death rates of some countries are given below. For comparing them drew bar diagram.

Country	USA	INDIA	JAPAN	GERMANY	UK
Birth rate	17.5	33.8	27.5	16.2	15.6
Death rate	10.6	24.3	17.6	11.2	12.1

101. Details of monthly income and expenditure of two families are as follows. Represent the same in sub divide bar diagram.

Income

	Family A	Family B
	6000	8000

Expenditure

	Family A	Family B
Food	3000	4000
Clothing	1000	2000
Rent	700	1000
Others	1300	1000

102. Kesari jeevan was given to 7 volunteers to see the effect on weight gain is as mentioned below. Find the variance of weight

Weight in kg. = 52,58,40,60,54,38,48

RESEARCH METHODOLOGY & MEDICAL STATISTICS

Part B   **30 Marks**
2 marks Questions

1. What is statistics?

2. What is medical statistics?

3. Definition of statistics.

4. Definition of medical statistics.

5. Define population.

6. Define sample.

7. What do you mean by data?

8. What do you mean by variable?

9. Define quantitative data.

10. Define qualitative data.

11. Data presentation –Explain

12. What do you mean by tabulation?

13. What do you mean by bar diagram?

14. Write the different type of bar diagram.

15. What do you mean by histogram?

16. Write about Pie-Diagram.

17. What are differences between histogram & bar diagram?

18. Cumulative frequency diagram – Explain it.

19. Scatter diagram –Explain

20. What do you mean by measures of location?

21. Define – Mean

22. Define – Median

23. Define – Mode

24. What do you mean by range?

25. What do you mean by Interquartile range ?

26. What do you mean by standard deviation?

27. What do you mean by variance?

28. What is standard error?

29. Define –   Random experiment.

30. Define - Set.

31. Define - Sub-set.

32. Define - Universal set.

33. Define - Null set.

34. Define - Sample space.

35. Define - Out come.

36. Define - Favorable outcome.

37. Define - Exhaustive case (event).

38. Define – Mutually exclusive cases (event).

39. Define – Event.

40. Define - Independent event.

41. Define – Equally likely event.

42. Define - Intersecting event.

43. Define - Union event.

44. Define - Complementary event.

45. Define – Difference event.

46. What is normal distribution?

47. What do you mean by test of significance?

48. What is Type-I error?

49. What is Type –II error?

50. What is critical region?

    [What is tailed test?]

51. Write some symbol of the parameters and their statistics.

52. Write name of non-parametric test.

53. Write about SAS.

54. Write about SPSS.

55. Write about MINITAB.

56. Write about MS.EXCEL.

57. Write about STATA.

58. Write about JASP.

59. Write about SIGMASTAT.

60. Write about R software.

61. Write about MATLAB software.