ANEKANT EDUCATION SOCIETY'S
TULJARAM CHATURCHAND COLLEGE OF ARTS, SCIENCE AND COMMERCE

AUTONOMOUS INSTITUTE
QUESTION BANK
Class:M.Sc. I (Semester – I)
Paper Code: ZOO: 4101
Paper: S.S.C.W. and Biostatistics

Question Bank: S.S.C.W.

Q.1 MCQ's

1. A researcher is generally expected to

a) Study of existing literature in a field
c) Generate new principles and theories
b) Synthesize the ideas given by others
d) Evaluate the findings of a study

2. An area of applied mathematics that has as its two major subdivision both descriptive and inferential quantitative analysis techniques

a) Discovery
c) Statistics
b) Research
d) All of the above

3. The word 'Research' means

a) Study
c) Education
b) Rediscover
d) Writing

4. Which of the following statement is correct?

a) Discoveries are researcher
c) Invention and Research are related
b) Researcher lead to discovery
d) None of the above

5. The main characteristic of scientific research is

a) Empirical
c) Experimental
b) Theoretical
d) All of the above

6. A doctor studies the relative effectiveness of two drugs of dengue fever. His research would be classified as

a) Descriptive Survey
c) Case Study

b) Experimental Research d) Ethnography

7. A good academic researcher is

a) Dependent on his teacher c) Open minded and radical

b) Follower of research plan strictly d) Highly knowledgeable

8. Research that is done to understand an event from the past is known as

a) Experimental research c) Replication

b) Historical research d) Archival research

9. The process not needed in Experimental Researcher is

a) Observation c) Controlling

b) Manipulation d) Content Analysis

10. Manipulation is always a part of

a) Historical research c) Descriptive research

b) Fundamental research d) Experimental research

11. Project in the post graduate courses are similar to

a) Basic research c) Action research

b) Applied research d) Evaluation research

12. Action research is

a) An applied research c) A longitudinal research

b) A cross sectional research d)A research carried out to solve instant problems

13. Field work based research is classified as

a) Empirical c) Historical

b) Experimental d) Biographical

14. The process not needed in experimental research is

a) Observation c) Manipulation and replication

b) Controlling d) Reference collection

15. The first step of research is

a) Selecting a problem c) Searching a problem

b) Finding a problem d) Identifying a problem

16. The last step of research is

a) Preparation of the report c) Analysis of data

b) Hypothesis testing d) Identifying a problem

17. A null hypothesis is

a) When there is no difference between the variables c) Subjective in nature

b) The same as research hypothesis d) When there is difference between the variable

18. To test null hypothesis, a researcher uses

a) T test c) ANOVA

b) X_2 d) Factorial analysis

19. Hypothesis is based on

a) Observation c) Experimentation

b) Verification d) Proof

20. Research that is done to examine the findings of someone else using the "same variables but different people" is which of the following?

a) Exploration c) Hypothesis

b) Replication d) Empiricism

21. A good researcher must possess

a) An inquiry mind c) A master's degree

b) A good health d) Enough funds

22. Books and records are the primary source of data in

a) Historical research c) Participatory research

b) Clinical research d) Laboratory research

23. In research, zero hypothesis is expressed as

a) H_1 c) H_2

b) H_0 d) HH

Q. 2 Answer in One sentence:

1) Two examples of synonyms.

2) Two examples of antonyms.

3) Syntax.

4) Precis

5) What are keyword

6) Tautology

7) Double negative

8) Double positive

9) What is editing

10) Jargon

11) Abbreviations

12) Power point

13) What is citation

14) Funding

15) Photographic plates

16) Legends

17) Paragraph

18) What is abstract

19) What is discussion

20) Hypothesis

Q.3 Short Notes:

1) How you will prepare a project proposal, discuss each section with justification?

2) Elaborate the significance of citation in writing a research paper.

3) What is power point? Explain its significance in preparation.

4) Define synonyms and antonyms with suitable examples (any three).

5) Differentiate between theory and hypothesis.

6) Explain the designing of title of a research journals.

7) Enumerate the common obstacles that occurs in effective communication.

8) Discussion is the major section of a research paper how it can be justified?

9) Mention the common errors that occurs in written communication.

10) Explain tautology, double negative and double positive.

11) What are objectives of a project work?

12) Write a note on power point slides.

13) Mention any four synonyms.

14) Mention any four antonyms.

15) What is IMRAD format?

16) Explain how to write ' Introduction.'

17) Write a note on different types of citations.

18) Why materials and method section is important in scientific paper.

19) What is the importance of tables and graphs in scientific paper?

20) Describe the "Discussion" section. Explain its significance.

21) What is citation? Describe styles of citation.

22) Describe outline of a scientific paper.

23) Concept of IPR.

24) Research project funding.

25) Relationship among reading, writing, hearing and speaking.

26) Write any four abbreviations of any scientific journals.

Question Bank: Biostatistics

A) Multiple Choice Questions

Q. 1. What would be the value of p and q when p^2=0.16 and 2pq = 0.48?

A) p = 0.16 and q = 0.84

B) p = 0.4 and q = 0.6

C) p = 0.04 and q = 0.96

D) p = 0.48 and q = 0.52

Q.2. What is formula for continuous series?

A) $Mean = \frac{\sum fm}{\sum f}$ B) $Mean = \frac{\sum fX}{\sum f}$

C) $Mean = \frac{\sum fm}{\sum fX}$ D) $Mean = \frac{\sum m}{\sum f}$

Q. 3. For binomial distribution mean =

A) np B) $\sqrt{npq}$ C) nq D) $(np)^2$

Q. 4. Normal distribution is also called as?

A) Laplacian distribution B) Gaussian distribution

C) Normal probability distribution D) All of these

Q. 5. For normal distribution which of the following statements are correct?

i) It is asymmetric

ii) It is asymptotic

iii) Mean = Mode = Median

A) Only i B) only i and ii

C) only ii and iii D) only iii

Q. 6. Tossing of a coin is _____ event

A) Mutually non exclusive B) Mutually Exclusive

C) dependent D) both B and C

Q. 7. To obtain mode graphically, we draw a

A) Ogive curve B) histogram

C) Line graph D) Pie diagram

Q.8. A coin was tossed 4 times. What is probability of getting 2 heads?

A) 0.5 B) 0.25

C) 0.375 D) 0.625

Q. 9. If regression line passes through origin, the value of 'a' is?

A) 1.0 B) 0.0

C) -1.0 D) Cant be predicted

Q. 10. The formula for Spearman's Rank correlation coefficient is

A) R = 1- $\frac{6\sum d}{n(n^2-1)}$ B) R = 1- $\frac{6\sum d^2}{n(n^2-1)}$

C) R = 1+ $\frac{6\sum d^2}{n(n^2-1)}$ D) R = $\frac{6\sum d^2}{n(n^2-1)}$

Q. 11. Y = a + bX is a linear equation, where slope =

A) a + b B) b
C) a D) bX

Q. 12. Judgment sampling is also called as _____

A) systematic sampling B) deliberate sampling
C) lottery method D) none of these

Q.13. For series of individual observations- 1, 3, 5, 7, 9, 11 the S.E. must be __.

A) 3.74 B) 1.52 C) 10 D) 1.57

Q. 14. If regression coefficient between two variables is 0.95 there is …… correlation

A) No B) Strong –ve

C) Strong +ve D) Perfect +ve

Q. 15. In regression equation Y = a + bX, 'a' is calculated by

A) a = $\frac{\sum Y^2 - b\sum X}{N}$ B) a = $\frac{\sum Y - b\sum X^2}{N}$

C) a = $\frac{\sum Y - b\sum X}{N}$ D) a = $\frac{\sum Y - b\sum X}{N^2}$

Q.16. The probability of failure in Biostatistics is 0.46. Calculated number of students failed in a class of 21 students must be ___ .

A) 8 B) 10 C) 12 D) 13

Q. 17. According to _____ "A measure of central tendency is a typical value around which other figures congregate".

A) Hardy Weinberg B) Laplace

C) Simpson and Kofka D) Moivre

Q. 18. When two or more events takes place simultaneously, their occurrence is known as _____.

A) Simple event B) multiple events

C) compound event D) dependent events

Q. 19. How many different couples can be formed out of 25 persons?

A) 625 B) 2^{25} C) 300 D) 50

Q. 20. What is the number of permutation of 4 things taken 2 at a time?

A) 6 B) 2 C) 16 D) 12

B) Define/Explain

1. What is sampling?
2. Define central tendency.
3. Define Mean.
4. Define Median
5. Define Mode.
6. Define Population and sample.
7. Define quartiles.
8. Define deciles
9. Define percentiles.
10. Define variance and Standard deviation.
11. What if coefficient of variation?
12. What is correlation?
13. What is regression?
14. Define probability

15. What is sample space and event?
16. Define independent event.
17. Define variable.
18. Define dependent event.

C) Short Answer Questions

19. What is a hypothesis?
20. What are type-I and type – II errors?
21. What are parametric tests?
22. Describe analysis of variance (ANOVA).
23. Describe one-way ANOVA.
24. Describe two-way ANOVA.
25. What is probability of heterozygotes, if p = 0.6 and q = 0.4?
26. What is a histogram? How it is drawn and when?
27. Calculate mean, mode and median for series,
    10, 18, 20, 14, 13, 16, 16, 19, 18, 16, 12, 11
28. Describe the plotting and importance of ogive curve.
29. Describe Karl Pearson's correlation coefficient.
30. What do you mean by presentation of data? Describe various methods of presenting data collected by investigators.
31. Draw a histogram from following data:

Daily wages	10-20	20-30	30-40	40-50	50-60	60-70
No. of employees	5	10	12	28	20	24

32. Describe normal distribution and its properties.
33. Describe Poisson distribution and its properties.
34. Describe binomial distribution and its properties.
35. Describe addition and multiplication theorems of probability.
36. Describe permutation and combination with suitable examples.
37. What is theoretical distribution?
38. Describe Student's 't' test.
39. Describe hypothesis testing and tests of significance.
40. What is Chi-square test? Describe its characteristics.
41. How we can calculate degree of freedom in Chi-square test?

D) Examples Based on Syllabus

42. Calculate mean, mode and median for the following data.

X	20	25	30	35	40	45	50
f	1	2	1	5	1	2	1

43. Calculate mean, mode and median for the following data.

Marks	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students	4	9	13	15	12	8	3

44. What are measures of dispersion? Describe standard deviation and coefficient of variation.

45. Calculate range, coefficient of range, standard deviation and standard error for the following data.

X	6	7	8	9	10	11	12
f	3	6	9	13	8	5	4

46. What is correlation? Describe graphical and mathematical methods of studying correlation.

47. Find out the coefficient of correlation in the following case.

Age of fish in days (X)	5	10	15	20	25	30	35
Weight in gram (Y)	3	7	12	15	20	24	30

48. Following are the ranks obtained by 10 students in two subjects, biostatistics and biochemistry, compute the rank correlation.

Biostatistics	7	2	1	10	8	4	9	6	3	5
Biochemistry	9	1	2	10	7	6	5	8	4	3

49. The probability of hitting a target in any shot is 0.28, if 4 shots are fired; find the probability that exactly 2 shots will hit the target.

50. Suppose the ages at a time of onset of a certain disease are approximately normally distributed with a mean of 45 years and S.D. of 8 years. Find the probability that a subject selected at random from this population will be
    a) More than 42 years
    b) 39 years or less
    c) Between 40 to 44 years

51. The random samples from the two normal populations are

Sample I	20	16	26	27	23	18	19
Sample II	27	33	32	35	30	34	36

At 2% level of significance, test whether these samples are from populations having equal variance.

52. A bag contains 10 white and 6 black balls. Two balls are drawn at random one after the other without replacement. Find the probability that both balls are black.
53. The incidence of occupational disease in an industry is such that the workmen have a 20% chance of suffering from it. What is the probability that out of 6 workmen, 4 or more will contact the disease?
54. In a city with 200 census blocks, each having approximately the same population the frequency distribution of cholera cases is as follows.

No. of cases	0	1	2	3	4	5
No. of city blocks	121	60	40	15	2	1

55. A sample of 1600 leaves has a mean length of 5.4 inch, could it be reasonably regarded as a sample from a population of leaves whose mean is 5.25 inch and S.D. 2.6 inch.
56. Two random samples of sizes 900 and 400 have means 21 and 21.3 with S.D. 3 and 3.1respectively. These two samples are drawn from the same population or different populations. Explain.
57. Two random samples of 1000 and 2000 forms have average yield 1920 lbs and 1955 lbs of corn per acre. If the S.D. of corn yield in the country is assume as 100 lbs, can you conclude the two samples differ significantly?
58. Two samples of sizes 300 and 400 are found to have the variance 5.85 and 7.29 respectively. Test the hypothesis that these two samples belong the same population.
59. Two estimates of correlation between the rain fall and the yield of maize have been worked out to $r_1 = 0.82$ for 32 pairs of observation and $r_2 = 0.55$ for 100 pairs of observations. Test the significance of the difference.
60. The president of USA has a total of 70 sons and 46 daughters. Is this an unusual proportion if the ratio of male to total births is in the population at large is 0.51?
61. In random samples of 10 persons selected from a population theirs heights noted to be,

Heights in inches	63	63	66	67	68	69	70	71	72	73

62. Out of 2000 men in occupation A, 400 die before attaining the age 50 while out of 1000 men in occupation B, 175 die before attaining the age 50. Is the difference in proportion significant?

63. When a black rat (heterozygous) is crossed with another heterozygous black rat, 43 black, 15 cream and 22 albino offspring are produced in the F2 generation. Using Chi-square test, the genetic hypothesis 9:3:4 are consistent with the data.
64. Certain manure was used on four plots of land A, B, C and D. Four beds were prepared in each plot and the manure used. The output of the crop in the beds of plots A, B, C and D is given below. Using ANOVA find out whether the difference in the means of the productions of crops of the plots is significant or not.

A	6	8	10	8
B	15	10	4	7
C	9	3	7	1
D	8	12	1	3

65. In a certain sample from a bi-variate population consisting of 27 items the correlation coefficient was calculated to be 0.34. Is this a significant correlation?
66. A coin is tossed 100 times of which head comes 60 times and tail 40 times. Would you accept the hypothesis that the coin is normal having no bias for either head or tail.
67. Set up two-ways ANOVA table for the following results.

Per acre production data for sorghum

Name of fertilizers	Variety of Sorghum seeds		
	Co. 1	Co. 5	Co. 9
Urea	6	5	5
Ammonium sulphate	7	5	4
Zinc Sulphate	3	3	3
Potash	8	7	4

E) Questions Based on Understanding of Concepts

1. Which statistical method will you apply to determine Km and Vmax of an enzyme and why?
2. How we can apply the test for goodness of fit in confirmation of Mendel's dihybrid ratio?
3. With suitable examples describe applications of variance in taxonomic studies.
4. In an experiment on LC_{50} determination study following data was obtained. Using correct statistical methodology calculate the LC_{50} value.

Log of Conc. in ppm	0.3010	0.4771	0.6021	0.6990	0.7782	0.8451
Probit of % mortality	3.72	4.16	4.48	5.25	5.52	6.28

5. How would you analyze the experimental data based on dose-response relationship?
6. Describe Kruskal-Wallis test of significance.
7. Describe skewness and kurtosis.
8. How you will apply ANACOVA test for scientific study?
9. An experiment was conducted to study the effects of certain drug in the heart beat rate.

Dose (mg/Kg body weight) (X)	0.5	0.75	1.0	1.25	1.5	1.75	2.0	2.25
Reduction in heat rate (Beats/min) (Y)	10	8	12	14	12	16	18	17

i. Draw scatter diagram and interpret it.
ii. Obtain two regression equations
iii. Estimate Y when X = 2.10

10. Draw a bar diagram showing the following experimental data showing effect of plant extracts on salivary amylase activity.

Group	mg glucose/mg protein/hr.	S.D.	Statistical significance over Control group
Control	1.29	0.08	--
Extract I	1.34	0.1	$p>0.05$
Extract II	2.60	0.09	$P<0.01$
Extract III	1.25	0.2	$p>0.05$