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2022

B.Pharm. 8th Semester (Regular) End-Term Examination
BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)
(New Regulation)
(w.e.f. 2017-18)

Full Marks – 75

Time – Three hours

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

1. Multiple choice questions (MCQ) (Answer *all* the questions) (20 × 1 = 20)
- (i) Which one of the following is not the measure of central value?
- (a) Mean
(b) Median
(c) Mode
(d) Variance
- (ii) Which one of the following is correct?
- (a) $AM \geq GM \geq HM$
(b) $GM \geq HM \geq AM$
(c) $GM \geq AM \geq HM$
(d) $HM \geq GM \geq AM$
- (iii) Which one of the following doesn't fall under Non-probability method of sampling?
- (a) Judgement sampling
(b) Quota sampling
(c) Stratified sampling
(d) Convenience sampling
- (iv) The Type-II error occurs in hypothesis testing, when
- (a) Hypothesis is true, test reject it
(b) Hypothesis is false, test accept it
(c) Hypothesis is true, test accept it
(d) Hypothesis is false, test reject it

[Turn over

- (v) Student t-test is performed for?
- (a) Large sample
 - (b) Small sample
 - (c) Medium sample
 - (d) All of the above
- (vi) If the calculated value of Variation Ratio (F) finds less than tabulated value, then
- (a) Hypothesis will be accepted
 - (b) Hypothesis will be rejected
 - (c) Hypothesis is errorful
 - (d) None of the above
- (vii) The Karl Pearson's coefficient of correlation (r) value lies between
- (a) -1 to +1
 - (b) 0 to +1
 - (c) -1 to 0
 - (d) None of the above
- (viii) If A and B are mutually exclusive events, then
- (a) $P(AB) = 0$
 - (b) $P(AB) = 1$
 - (c) $P(AB) = \frac{1}{2}$
 - (d) None of the above
- (ix) If ${}^n C_r P^r q^{n-r}$ is a term in a binomial distribution, find the value of n and r
- (a) $n = 12, r = 6$
 - (b) $n = 6, r = 12$
 - (c) $n = 6, r = 6$
 - (d) $n = 12, r = 12$
- (x) The standard deviation in binomial distribution is expressed by
- (a) $\sigma = npq$
 - (b) $\sigma = \sqrt{(\text{Mean} \times q)}$
 - (c) $\sigma = \sqrt{(\text{Mean} \times p)}$
 - (d) $\sigma = np$
- (xi) From a bag containing 20 black and 10 white balls, a ball is drawn at random. What is the probability that it is white?
- (a) $\frac{1}{3}$
 - (b) 1
 - (c) $\frac{2}{3}$
 - (d) 0
- (xii) If chance of an event being a success is small, then the probability distribution will be
- (a) Binomial distribution
 - (b) Poison distribution
 - (c) Normal distribution
 - (d) Polynomial distribution

- (xiii) Which one of the following is not a non-parametric test?
- U-test
 - H-test
 - Fr-test
 - F-test
- (xiv) The detailed plan of a research in written form is called
- Research article
 - Research report
 - Research protocol
 - Research note
- (xv) Which clinical trial phase is not performed on patient?
- Phase I
 - Phase II
 - Phase III
 - Phase IV
- (xvi) If you have 30 animals for 3 treatments, then how many blocks you will prepare for a randomized block design?
- 3
 - 30
 - 10
 - 15
- (xvii) For a good statistical test, the power of the test $(1-\beta)$ should be
- Nearer to 1
 - Nearer to 0
 - 1/2
 - None of the above
- (xviii) Fill in the blanks : Mode = 3 _____ - 2 _____ .
- Mean, Median
 - Mean, Standard Deviation
 - Median, Mean
 - None of the above
- (xix) If $r_{12}=0.98$, $r_{13}=0.44$ and $r_{23}=0.54$ then the value of $R_{1,23}$ will be
- 0.986
 - 0.888
 - 0.786
 - 1.123
- (xx) Which one of the following describes the relation between Coefficient of correlation (r) and regression coefficients (b_{xy} and b_{yx})
- $r^2 = b_{xy} b_{yx}$
 - $r = b_{xy} b_{yx}$
 - $r = \sqrt{b_{xy}/b_{yx}}$
 - $\sqrt{r} = b_{xy}b_{yx}$

2. Short answers (Answer any seven) (7 × 5 = 35)
- (a) Differentiate mean, mode and median? Find out the arithmetic mean and median from the given data. (3+2)
1, 3, 5, 2, 6, 4, 9, 7, 8
- (b) Define standard deviation. Find out the standard deviation from the given data. (1+4)
251, 255, 240, 277, 260, 288, 245, 290, 263, 272
- (c) What is the full form of ANOVA and why it is used in statistics? Properly represent the One-way ANOVA table mentioning full forms of the abbreviations used. (2+3)
- (d) What is probability? Enumerate various EVENTS considered in probability calculation. (1+4)
- (e) A coin is tossed six times. What is the probability of obtaining three or more heads? (5)
- (f) Write a note on different types of graphs. (5)
- (g) What is factorial design? Briefly mention the advantages of factorial design. (1+4)
- (h) Discuss various optimization techniques. (5)
- (i) Briefly describe different statistical software used in research for analysis. (5)
3. Long answers (Answer any two) (2 × 10 = 20)
- (a) What are the essence of sampling? Briefly describe the various methods involving in sampling? (5+5)
- (b) What is research? What are the significance of doing research? Describe the various phases of a good research? (1+2+7)
- (c) Write a note on: (5+5)
- (i) Plagiarism.
- (ii) Cohort study and randomized block design.

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17