POST GRADUATE DIPLOMA IN BIOETHICS

Term-End Examination

00234 **December, 2014**

MHS-014 : RESEARCH METHODOLOGY

Time : 2 hours   *Maximum Marks : 70*

PART A

*Attempt **all** questions. Each question carries one (1) mark. Select the most appropriate choice from the given choices for each of the following questions.*   *50×1=50*

1. The Thermometer you are using is set incorrectly and adds two points to the true value each time a measurement is taken to adjust the error. However, the error can be reproduced in the future. This type of error is known as

   (1) Systematic error

   (2) Sampling error

   (3) Reliability

   (4) Random error

2. One of the following is not true for an odds ratio :

   (1) Odds ratio ranges from 0 to infinity

   (2) If odds ratio is less than one, the event is less likely to occur

   (3) If odds ratio is greater than one, the event is more likely to occur

   (4) Odds ratio ranges from –infinity to +infinity

3. When the information collected for use as a study variable is inaccurate, the incorrect measured variable can be either a disease outcome or an exposure. This type of bias is called
   (1) Selection bias
   (2) Measurement bias
   (3) Random bias
   (4) Non Random bias

4. Mark the binomial distribution situation
   (1) Number of printing mistakes in a page of a book
   (2) Occurrence of head in the throw of a coin
   (3) Number of red cells in one ml of blood
   (4) Number of heads in a throw of 20 coins

5. In epidemiology, mixing the effect of the exposure under the study on the disease with that of a third factor that is associated with the exposure is
   (1) Bias
   (2) Unbias
   (3) Confounding
   (4) Mixing Bias

6. Pick the formula for Poisson Distribution
   (1) $P(X = x) = \dfrac{e^{-x} x^{\lambda}}{x!}$ x = 0, 1, 2....; $\lambda > 0$

   (2) $P(X = x) = \dfrac{e^{-\lambda} \lambda^{x}}{x!}$ x = 0, 1, 2....; $\lambda \neq 0$

   (3) $P(X = x) = \dfrac{e^{-\lambda} \lambda^{x}}{x!}$ x = 0, 1, 2....; $\lambda > 0$

   (4) $P(X = x) = Nc_{x}, p^{x}q^{n-x}$ x = 0, 1, 2... N; $0 < P < 1$

7. (i) Bias cannot be "controlled for" at the analysis stage
   (ii) Bias can lead to an over or underestimation of an effort.
   (1) (i) True (ii) False
   (2) Both are True
   (3) (i) False (ii) True
   (4) Both are False

8. For a normal distribution, select the odd one :

   (1) Mean = Median = Mode

   (2) The area under standard normal curve is equal to one

   (3) It is mesokurtic

   (4) The area under normal curve is equal to one

9. Positive confounder causes over estimation of an association and negative confounder causes under estimation of an association.

   (1) The statement is True

   (2) The statement is False

   (3) Only first part is True

   (4) Only second part is True

10. Choose the measure that is based on every item of observation :

    (1) Range

    (2) Quartile deviation

    (3) Standard deviation

    (4) Mode

11. Purpose of phase 2 trials is

    (1) To find a safe dosage

    (2) To compare the new agent or intervention

    (3) To determine whether the agent or intervention has an effect or not

    (4) To evaluate long-term safety and efficiency

12. A statistical measure based on entire population is

    (1) Sample parameter

    (2) Statistic

    (3) Estimate

    (4) None of the above

13. Effect of exercising or Omitting smoking is an example of

    (1) Agent Studies

    (2) Chemoprevention Studies

    (3) Action Studies

    (4) None of the above

14. Statistical test allows us to make inference based on

    (1) Sample

    (2) Population

    (3) Sample of Population

    (4) All of the above

15. For computing sample size for clinical trial we need to specify

    (1) The significance level

    (2) The power of the test

    (3) Standard deviation of clinical parameter

    (4) All of the above

16. In a statistical test, if mean scores from two populations differ significantly then

    (1) Accept Null hypothesis

    (2) Reject Null hypothesis

    (3) Accept Alternative hypothesis

    (4) None of the above

17. Randomization is a process that assigns participants

    (1) By chance

    (2) By choice

    (3) Alternatively to either arms

    (4) None of the above

18. With large sample size, an estimate will be

  (1) Closer to population parameter

  (2) Equal to population parameter

  (3) With more standard error

  (4) None of the above

19. Double-Blinding means

  (1) Participant and statistician do not know to which the participants are assigned

  (2) Neither the participant nor the investigator knows to which group the participants are assigned

  (3) Either participant or the investigator knows to which group the participants are assigned

  (4) Participants and investigator close their eyes before administering treatment

20. If a statistical test does not reject null hypothesis, then it is possible that we make

  (1) Type I error

  (2) Type II error

  (3) Both Type I and Type II error

  (4) The power of test high

21. Which of the following statements is true with regard to intention to treat analysis ?

  (1) Do not give an unbiased estimate of treatment effect

  (2) Estimate of treatment effect is generally not conservative

  (3) Retains balance in prognostic factor from the original allocation

  (4) None of the above

22. To increase the likelihood of obtaining significant result, we should have

  (1) Large difference between groups

  (2) Smaller standard error

  (3) Large sample size

  (4) All of the above

23. Interim analysis
    (1) Should always be done
    (2 Should never be done
    (3) Called data – dependent stopping
    (4) None of the above

24. Probability of correctly rejecting Null hypothesis is
    (1) Alpha
    (2) Beta
    (3) Power
    (4) None of the above

25. Sub -group analysis are indicated
    (1) When RCT is done on a large sample
    (2) To look for potential heterogeneity of treatment effect related to risk
    (3) Always
    (4) Never to be done

26. Which one of the following actions will increase the power ?
    (1) Increase Alpha
    (2) Increase Beta
    (3) Increase the sample size
    (4) None of the above

27. GCP in clinical trial stands for
    (1) Good Common Practice
    (2) General Criteria for Patients
    (3) Good Clinical Practice
    (4) God Can Protect

28. Which one of the following is stronger correlation ?
    (1) –1
    (2) 0·98
    (3) 0·0
    (4) 0·5

29. Clinical trial monitoring is done
  - (1) To ensure favourable results
  - (2) To avoid bias
  - (3) To control confounders
  - (4) None of the above

30. Regression is
  - (1) To measure the association between two variables
  - (2) To estimate dependent variables using independent variable
  - (3) To estimate independent variable using dependent variable
  - (4) It is a measure of association

31. A hypothesis can be constructed based on
  - (i) Observation
  - (ii) Biological understanding
  - (iii) Social understanding
  - (iv) Intuition
  - (1) (i) and (iv)
  - (2) (ii) and (iii)
  - (3) (i), (ii) and (iii)
  - (4) (i), (ii), (iii) and (iv)

32. In a regression equation $y = 10 + 5x$
  - (1) Correlation coefficient between x and y is 5
  - (2) For a unit increase in x, there is 10 units increase in y
  - (3) For a unit increase in y, there is 5 units increase in x
  - (4) For every unit change in x, there is 5 units change in y

33. A variable that changes in response to the another variable is
  - (1) Independent variable
  - (2) Dependent variable
  - (3) Random variable
  - (4) Manipulate variable

34. In a regression of birth weight on Gestational age
  - (1) Birth weight is the predictor
  - (2) Gestational age is the predictor
  - (3) Both Birth weight and Gestational age are predictors
  - (4) Information is insufficient to answer

35. An experiment compares a new drug against a standard drug. Then the patient should be allocated to either the new drug and the standard drug

   (1) Based on the response to treatment

   (2) Based on the normality

   (3) By Randomization

   (4) All the above

36. The 95% confidence interval for the prevalence of hypertension is (0.12, 0.29). The true interpretation is

   (1) Probability that this interval may hold the true value, is 0.95

   (2) The population parameter will be between 0.12 to 0.29

   (3) The estimated value is higher than the expected level in the population

   (4) None of the above

37. Study (i) — Compare drugs for treatment for Asthma with drugs for treatment of diabetes.

   Study (ii) — Comparing drugs for treatment of Asthma that act by different mechanisms.

   (1) Study (i) is possible combination

   (2) Study (i) and (ii) are possible combination

   (3) Study (i) and (ii) are not possible

   (4) Study (i) not suitable, Study (ii) is possible combination

38. Statistical list is probability of

   (1) Acceptance of Null Hypothesis when it is true

   (2) Rejecting the Null Hypothesis when it is true

   (3) Rejecting Null Hypothesis when Alternate Hypothesis is true

   (4) Rejecting the Alternate Hypothesis when it is true

39. Research provides the information for

   (1) Irrational decision making

   (2) Guessing the outcome

   (3) Rational decision making

   (4) None of the above

40. P value is a statistical test i.e.

(1) Probability of getting extreme values under null hypothesis

(2) Probability of getting extreme values under alternate hypothesis

(3) Probability of rejecting null hypothesis when it is true

(4) None of the above

41. Translational research

(1) It is paradigm to biomedical research

(2) It focuses as interactive feedback loops

(3) It accelerates knowledge transfer from bedside to the bench

(4) All the above

42. Statistical test on Hypothesis is

(1) Always based on null hypothesis

(2) Always based on alternate hypothesis

(3) Based both on null and alternate hypothesis

(4) Based on power of the test

43. Factorial experiment helps in

(1) Studying several factors at a time

(2) Studying a single factor multiple times

(3) Evaluating the effects of interaction

(4) Both (1) and (3)

44. In a study of comparison of mean ages at marriage of women in two different states in India, the Null hypothesis will be

(1) There is significant difference in mean ages of marriage

(2) Mean marriage ages are same in the two states

(3) Mean age of marriage in one state is higher than the other

(4) There is difference in mean ages of marriage

45. Institution Review Board (IRB)

(1) Is empowered to approve the study

(2) Cannot insist on modification

(3) Will look only at the ethical aspect of study

(4) None of the above

46. In an experiment, blood pressure levels of 15 subjects were measured before and after a particular intervention. The probable statistical test is

   (1) t-test

   (2) Independent t-test

   (3) Paired t-test

   (4) z-test

47. Case-Control study design

   (1) Provides maximum evidence

   (2) Provides greater evidence than cohort study

   (3) Provides minimal strength of evidence

   (4) Provides better evidence than case series

48. Pick the odd one out :

   (1) Signed rank test

   (2) Mann-Whitney U test

   (3) t-test

   (4) Kruskal Wallis test

49. A well designed clinical trial is

   (1) Always ethically sound

   (2) Need not be ethically sound

   (3) Mostly not ethically sound

   (4) Occasionally ethically sound

50. If multiple statistical tests are done on same data, then

   (1) Type I error decreases

   (2) Type II error decreases

   (3) Type I error increases

   (4) Type II error increases

PART B

Write short notes (in 200 – 300 words) on each of the following questions.
Each question carries five (5) marks.   4×5=20

5I. Steps in developing an effective study design

52. Odds Ratio of Relative Risk

53. Probability Sampling

54. Uses and the important points to the observed for presenting data in graphical form