KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

COLLEGE OF SCIENCE

DEPARTMENT OF THEORETICAL AND APPLIED BIOLOGY

B.Sc. (Environmental Science/Biological Sciences), Second Semester Examinations, 2018/2019

Third Year

SCI 352 SCIENTIFIC RESEARCH AND COMMUNICATION

MAY, 2019 **TIME: 2 HOURS**

INDEX NUMBER | | | | | | | |

PROGRAMMME OF STUDY.....

GENERAL INSTRUCTIONS

(i) Write your index number and programme of study CLEARLY in the spaces provided on this page

(ii) There are two sections of this paper; A and B. ATTEMPT ALL QUESTIONS

(iii) For SECTION A, shade the correct answer/s on the scannable form and also circle on the question paper

(iv) For SECTION B, answer Question 1 and any other TWO questions in the answer booklet.

(v) At the end of the session, please hand over the question paper, answer booklet and the scannable form to the invigilator.

You are NOT to start work or turn to the next page until you are told to do so.

CAUTION

NO PART OF THE QUESTION PAPER SHOULD BE TAKEN OUT BY ANY STUDENT

Section A: Multiple Choice Questions [50 points]

1. Ama's mother uses the Authoritarian parental style. His dad who is laid back would rather use the Neglectful style which allows her to do what she wants. Yet Ama's grandmother who feels children should be allowed to voice their ideas uses the Authoritative style when Ama visits her during holidays. During an interview as a potential mother, Ama would capture these as …….. data type.
   a. Discrete
   b. Continuous
   c. Nominal
   d. Ordinal
   e. Combination of Discrete and nominal

2. A researcher decided to put students into groups based on their CWAs and had four different groups. He then systematically selected one student from each group and assigned some clear roles and responsibilities. Here, the researcher used ……..in selecting the students.
   a. Simple random sampling
   b. Cluster random sampling
   c. Stratified random sampling
   d. Two stage cluster sampling
   e. None of the above

3. Which of the following research types employs quantitative data a lot to analyze and sum up the data obtained?
   a. Descriptive
   b. Explorative
   c. Experimental
   d. Case study
   e. Analytical

4. As a Researcher in Mobile elements, if I include only mobile elements with a deletion in DNA sequence which code for a certain protein, I am using ……
   a. Cluster sampling
   b. Stratified sampling
   c. Judgmental sampling
   d. Multistage sampling
   e. Convenience sampling

5. A good scientist ……
   a. is skilled and falsifies results
   b. biased and curious
   c. prudent and observant
   d. a and c
   e. only c

6. Once you conduct research, you should always raise questions .....
   a. All the time
   b. Occasionally
   c. Sometimes
   d. a only
   e. a and c only

7. ..... ends up producing situational-oriented information which may direct policy changes.
   a. Correlational design
   b. Descriptive design
   c. Experimental design
   d. Quasi-experimental
   e. Quasi-correlational

8. Which of the following depicts research?
   a. Picking up several information from the internet
   b. Creating new knowledge
   c. Conducting an investigation
   d. a and b
   e. b and c

9. As a research scientist conducting research, ...
   a. controlled observations should always be recorded
   b. uncontrolled observations are recorded
   c. controlled observations should never be recorded
   d. all the above
   e. none of the above

10. Which of the following research types may end up making proposals about future events such as the occurrence of a new disease in a certain population?
   a. Quasi-experimental
   b. Explorative
   c. Predictive
   d. Descriptive
   e. Correlational

11. In terms of researcher dependence, quantitative research ....
   a. results in subjective findings
   b. is based on how the Researcher feels
   c. results are not standardized
   d. a and b
   e. none of the above

12. Sometimes, as a student, you may be interested in understanding how a certain system works and so you conduct a study into it. Your research may be described as .....
    a. Quantitative
    b. Ethnography
    c. Pure
    d. Phenomenology
    e. Grounded

13. Which of the following presents the alternate hypothesis mathematically?
    a. $H_{(A1)}$ $X \geq Y$
    b. $H_{(A1)}$ $X < Y$
    c. $H_{(A1)}$ $X = Y$
    d. $H_{(A1)}$ $X \neq Y$
    e. $H_{(A1)}$ $X \leq Y$

14. A student was invited to present his work during an international conference. The student had novel results but failed to impress the scientific audience. Which of the following may have caused this?
    a. His audience were tired since the previous speaker was not captivating
    b. He spoke eloquently but beyond the time allocated to him
    c. He kept on cracking his knuckles
    d. b only
    e. a, b and c

15. Which of the following is/are not true?
    a. research requires a clear plan
    b. research may not always be guided by hypothesis
    c. gathering data is not always important
    d. only b and c
    e. all the above

16. If a student is reviewing literature on the performance of students over the years, he/she is performing a/an .....
    a. Case study
    b. Historical research
    c. Exploratory research
    d. Grounded theory
    e. Quasi-experimental study

17. Research is .....
    a. dynamic, flexible and oval
    b. dynamic, helical and empirical
    c. systematic, helical and empirical
    d. a and b
    e. b and c

18. When identifying how culture is dynamic over several years of time, a student ends up conducting ..... study.
    a. Case study
    b. Grounded theory
    c. Time series
    d. Ethnography
    e. Historical

19. When is data transformed into information?
    a. When data is contextualized and condensed
    b. When data is categorized and calculated
    c. When data is corrected and condensed
    d. All except a
    e. All the above

20. The research process is known to be cyclical because it.....
    a. begins with an answer and ends with another answer
    b. begins with a question and ends with an answer
    c. begins with a question and ends with a question
    d. begins with a question and ends with a recommendation
    e. begins with a method and ends with an answer

21. The following may be conducted during the implementation phase except .....
    a. Pretesting
    b. Piloting
    c. 50% of the work
    d. Actual work
    e. None of the above

22. When deciding on what to say during a presentation, you need to .....
    a. Define the key message and decide on what you want your audience to remember
    b. Define your message and think through the actions you would want your audience to take
    c. a only
    d. a and b
    e. neither a nor b

23. Data in no logical order is ..... and belongs to the ..... group of data.
    a. Nominal, Continuous
    b. Ordinal, Quantitative
    c. Ordinal Qualitative
    d. Nominal, Qualitative
    e. Nominal, Discrete

24. Research in science is the pursuit of truth with the help of.....
    a. Unplanned activities and curiosity
    b. Experiment and comparison
    c. Study and observation
    d. All except a
    e. All the above

25. Advantages of qualitative research include the following except.....
    a. use of observations and measurements
    b. use of small samples
    c. conducting studies in natural settings
    d. observation and interpretation of results
    e. identification of ideas and interpretation of results

26. If a student recruits only short girls into a study focused on identifying the gene which confers 'shortness to girls', she selected her participants using .....
    a. Snowballing sampling
    b. Quota sampling
    c. Purposive sampling
    d. Random sampling
    e. Convenience sampling

27. Based on the immediate purpose of a study, research may be categorized as.....
    a. Qualitative versus Non-Qualitative
    b. Descriptive versus Applied
    c. Analytical versus Basic
    d. Applied versus Pure
    e. Basic versus pure

28. As a researcher conducting a study on the type of fishes in an aquarium, if I select fishes after every 4th dip with my bowl, I am employing .....
    a. Stratified random sampling
    b. Systematic random sampling
    c. Cluster random sampling
    d. Judgmental sampling
    e. Four stage cluster sampling

29. Quantitative research methods include the following excerpt .....
    a. Descriptive, experimental and explorative
    b. Correlational, Quasi-experimental and experimental
    c. Experimental, descriptive and correlational
    d. Correlational, descriptive and quasi-experimental
    e. Experimental, quasi-experimental and descriptive

30. In a/an ..... research, investigators are interested in explaining how or why something occurs.
    a. Exploratory
    b. Descriptive
    c. Analytical
    d. Predictive
    e. Correlational

31. Select the best feature/s of hypothesis.
    a. It is always specific
    b. It can be tested
    c. It may be false
    d. It can be rendered useless when proven false
    e. It can predict the effect of a situation

32. A research idea maybe generated through ways such as .....
    a. interacting with experts
    b. being adventurous
    c. observation and asking questions
    d. all but a
    e. all the above

33. The shoe sizes of a total number of 50 prisoners from the 16 communities in the Western region of Ghana may be classified as .....data.
    a. Continuous and Nominal
    b. Only Ordinal
    c. Only Discrete
    d. Only Nominal
    e. Nominal and quantitative

34. When preparing for a scientific presentation, the objective of the presentation should include the following except.....
    a. The aims of my study in relation to my audience
    b. Who my audience are
    c. Perceive what my audience need to know about my topic
    d. a only
    e. a and b

35. Research design may be regarded as the ..... of the study.
    a. logical structure
    b. blue print
    c. logistical structure
    d. plan for analyzing the data
    e. all the above

36. The following are activities you will undertake during the implementation phase of your scientific project .....
    a. Assembling all materials and equipment
    b. Identifying the laboratories you would conduct some analysis
    c. Obtaining skills relevant in the performance of the study
    d. Only a, b and c
    e. All but c

37. Mr. Ameyaw decided to join the political party UQC in Ghana. In 2002, he was a member of the RPC political party. He further changed his mind and joined the RPP in 2012. In collecting data on the political party he belongs to during a recently organized national census, the enumerators would capture such data as .....
    a. Nominal data
    b. Continuous data
    c. Discrete data
    d. Ordinal data
    e. Both nominal and ordinal

38. When communicating your research, what are some of the strategies you can employ to enable you get the attention of your audience?
    a. Use comments and examples
    b. Ask compelling questions
    c. Use statements and quotes
    d. a and b
    e. a, b and c

39. Which of the following are types of research design?
    a. Case study and Sequential design
    b. Causal and Meta-analysis design
    c. Cross sectional and Longitudinal design
    d. Only a
    e. All of the above

40. The title of your research article needs to be.....
    a. Attractive and Compelling
    b. Specific and concise
    c. Accessible and informative
    d. b and c
    e. a, b and c

41. Which of the following statement is/are true?
    a. Sound research studies can be complex
    b. Sound research begins with complicated thoughts
    c. Sound research studies are easy to read and understand
    d. Sound research can be a daunting task
    e. All the above

42. While the distance a runner covers within 20 minutes is a ....., the number of females who can cover the same distance but within 50 minutes is .....
    a. Continuous data, discrete data
    b. Discrete data, continuous data
    c. Continuous data, continuous data
    d. Discrete data, discrete data
    e. None of the above

43. The following steps run throughout the entire research process except?
    a. Record keeping and asking questions
    b. Asking questions and planning
    c. Record keeping and literature review
    d. Planning, monitoring and evaluation
    e. None of the above

44. Prof. Koffi was invited to deliver s seminar on a research he conducted 10 years ago. In preparing for this seminar, which of these should be critical when he is communicating his study research to an audience?
    a. He needs to know his audience
    b. He needs to think about the purpose of his presentation
    c. He needs to rehearse his presentation
    d. a and b
    e. a, b and c

45. The following should be included in your data analysis plan except?
    a. What you hope to learn from your research question
    b. How you want to present the data you have collected
    c. How you want to present your pretest data
    d. The statistical package you want to use in analyzing the data
    e. Why you evaluated the study

46. In conducting a study on the burden of chlorosis in a protected ecosystem, the researchers created quadrants to enable effective sampling of the leaves from selected trees. The study was conducted in the Mole National Park but the researchers extrapolated the results to all trees in the northern part of Ghana. Under such conditions, leaves of trees in Mole and Ghana will be known as ..... and ..... respectively.
    a. Target population, sample
    b. Target population, study population
    c. Study population, sample
    d. Study population, target population
    e. Sample, target population

47. When a research throws a dice in order to select participants to include in a study, the researcher:
    a. wants to be limited to who to include in the study
    b. wants people with unique characteristics to be included in the study
    c. is not sure who to include in the study
    d. wants to give the chance for everybody to be included in the study
    e. does not want certain people to be included in the study

48. Which of the following is a key requirement for many statistical softwares?
    a. Pretesting and piloting
    b. Coding of your variables
    c. Creating dummy variables
    d. Double entry of data
    e. None of the above

* 49. Sources of information maybe limited to the following except .....
    a. information on social media and videos
    b. books and research journals
    c. editorials and information from communities
    d. all but a and c
    e. none of the above

50. Which of the following is/are true about quantitative variables?
    a. these could be whole numbers with definite numbers
    b. these could be whole numbers with infinite numbers
    c. these have numbers which can be jumped from one value to another
    d. you can estimate the means of such variables
    e. you can do some arithmetic operations

Section B: Short Essays [50 points]

1. Read the passage below and use it to answer questions (*i - x*) that follow:

Five undergraduate students conducted a study to gain insight into the impact of road works on a major road which had a lot of potholes thereby causing road accidents on daily basis. They went as far as counting the number of potholes per kilometer on the 5-kilometer stretch. They also collected data on cars plying the road before and after the road works. Additionally, they organized focus group discussions (FGDs) to gain first hand information from taxi drivers, private car owners and tricycle and bicycle riders on the frequency they take their vehicles to their mechanics. Further, the number of women who had children with some of the road construction workers were also identified. Some had as many as four children with different women in the community (average = 3). At the end of the study, two of the students had their Cumulative Weighted Averages (CWAs) increased by 3.3 while one had increased by 1.2. The rest had their CWAs remain the same.

i. Propose a suitable research topic for the study (keep word limit to 20 words). **[3 points]**
ii. In ONE (1) sentence, suggest the research problem the students tried solving. **[3 points]**
iii. Identify TWO (2) specific objectives of the study. **[2 points]**
iv. Indicate any three factors which may have informed their choice of study area? **[3 points]**
v. Identify FIVE (5) discrete variables they collected. **[5 points]**
vi. Identify ONE (1) nominal data they could have collected but forgot to collect. **[2 points]**
vii. Suggest ONE (1) possible type of study the students conducted. **[2 points]**
viii. Suggest a suitable method they may have used in selecting the road users to be interviewed (bear in mind they gave all road users equal chances of being interviewed). Give one reason for your choice of method. **[3 points]**
ix. Suggest a suitable method used in identifying women who had children with the workers (it was impossible for them to give all the women in the study area equal changes of being identified). **[2 points]**

x. Fill in the Table below by ticking (✔) the best for the variable indicated. **[5 points]**

Variable	Nominal	Ordinal	Discrete	Continuous
The names of the students				
The type of cars plying the road				
The number of women in two FGDs				
Proportion of children who are males				
The gender of the students				

2. How do you identify a research problem? **[10 points]**
3. As a student, how can conducting research train you as a Junior Scientist? **[10 points]**

A. K Anning/A. A. Sylverken