

Seat No.	
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**M.Phil/Ph.D. Entrance Examination, September - 2019**  
**BIO-TECHNOLOGY ENGINEERING [BT]**

**Day and Date : Wednesday, 18 - 09 - 2019****Total Marks : 100****Time : 01.00 p.m. to 03.00 p.m.**

- Instructions :**
- 1) All questions are compulsory.
  - 2) Each question carries 2 marks.
  - 3) Answers should be marked in the given OMR answer sheet by darkening the appropriate option.
  - 4) Use black ball point pen only for marking the circle. Do not make any stray mark on the OMR Answer Sheet.
  - 5) Follow the instructions given on OMR Sheet.
  - 6) Rough work shall be done on the sheet provided at the end of question paper.
  - 7) Only non programmable calculators are allowed.

**Section - I Research Methodology [RM]**

- 1) What is a research design?
  - a) A way of conducting research that is not grounded in theory
  - b) The choice between using qualitative or quantitative methods
  - c) The style in which you present your research findings, e.g. a graph
  - d) A framework for every stage of the collection and analysis of data
  
- 2) Which of the following requirements for a dissertation may depend on your institution?
  - a) Whether an abstract should be included
  - b) The format for referencing
  - c) The word limit
  - d) All of the above

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- 3) Which of the following is a general rule of thumb for designing Questions?
- a) Always bear in mind your research Questions
  - b) Never ask a closed Q.
  - c) Always use vignettes rather than open Questions
  - d) Use ambiguous terms to put respondents at ease
- 4) Design does not include
- a) Features of shape
  - b) Composition of lines or colours
  - c) Mode or principle of construction
  - d) None of the above
- 5) What is the primary approach that is used by the IRB to assess the ethical acceptability of a research study?
- a) Utilitarianism
  - b) Deontology
  - c) Ethical skepticism
  - d) Comparativeism
- 6) The strongest evidence for causality comes from which of the following research methods?
- a) Experimental
  - b) Causal-comparative
  - c) Correlational
  - d) Ethnography
- 7) In research, something that does not “vary” is called a \_\_\_\_\_.
- a) variable
  - b) method
  - c) constant
  - d) control group
- 8) The statement of purpose in a research study should :
- a) Identify the design of the study
  - b) Identify the intent or objective of the study
  - c) Specify the type of people to be used in the study
  - d) Describe the study

- 9) Sources of researchable problems can include :
- a) Researchers' own experiences as educators
  - b) Practical issues that require solutions
  - c) Theory and past research
  - d) All of the above
- 10) What kind of ideas can't be empirically researched?
- a) Effectiveness of different methods of instruction
  - b) Description of educational practices
  - c) Issues of values and morality such as the correctness of having prayer in schools
  - d) Factors helpful in predicting future drug use
- 11) Which of these is not a method of data collection?
- a) Questionnaires
  - b) Interviews
  - c) Experiments
  - d) Observations
- 12) Which scale is the simplest form of measurement?
- a) Nominal
  - b) Ordinal
  - c) Interval
  - d) Ratio
- 13) Which of the following terms refers to a statistical method that can be used to statistically equate groups on a pretest or some other variable?
- a) Experimental control
  - b) Differential influence
  - c) Matching
  - d) Analysis of covariance
- 14) The goal of \_\_\_\_\_ is to focus on summarizing and explaining a specific set of data.
- a) Inferential statistics
  - b) Descriptive statistics
  - c) None of the above
  - d) All of the above

- 15)** What is the median of this set of numbers: 4, 6, 7, 9, 2000000?
- a) 7.5
  - b) 6
  - c) 7
  - d) 4
- 16)** A cell is a combination of two or more \_\_\_\_\_ in a factorial design.
- a) Research designs
  - b) Research measurements
  - c) Dependent variables
  - d) Independent variables
- 17)** A \_\_\_\_\_ is a range of numbers inferred from the sample that has a certain probability of including the population parameter over the long run.
- a) Hypothesis
  - b) Lower limit
  - c) Confidence interval
  - d) Probability limit
- 18)** Gender (Male, Female) is?
- a) Nominal random variable
  - b) Discrete random variable
  - c) Continuous random variable
  - d) Ordinal random variable
- 19)** Which of the following statements sounds like a null hypothesis?
- a) The coin is not fair
  - b) There is a correlation in the population
  - c) There is no difference between male and female incomes in the population
  - d) The defendant is guilty
- 20)** The blood group is
- a) Nominal random variable
  - b) Discrete random variable
  - c) Continuous random variable
  - d) Ordinal random variable

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- 21) Sarah is a qualitative researcher studying how children and parents interact in Head Start Centers. As she examines her data (videotapes and transcripts), she jots down notes concerning the interactions, generating hypotheses, suggesting relationships among categories of information she is examining and so on. This process of jotting notes as she examines the data is called :
- a) Memoing
  - b) Transcription
  - c) Facesheet coding
  - d) Drawing diagrams
- 22) When a citation includes more than \_\_\_\_\_ authors, only the surname of the first author is cited followed by et al.
- a) 3
  - b) 4
  - c) 5
  - d) 6
- 23) Which of the following is not one of the seven major parts to the research report?
- a) Results
  - b) Abstract
  - c) Method
  - d) Footnotes
- 24) What is the name for a prediction that is derived from a theory?
- a) hypothesis
  - b) fact
  - c) correlation
  - d) observation
- 25) If the people receiving a particular experimental treatment behave in a particular way because of their own beliefs about that treatment, we say :
- a) there is a subject-expectancy effect
  - b) there is an observer-expectancy effect
  - c) this is the result of a blind study
  - d) this is the result of poor reliability

**Section - II Bio-Technology Engineering [BT]**

- 26) Cellulase is used in which type of industry?
- a) Food industry    b) Paper industry  
c) Biofuel industry                                      d) Chemical industry
- 27) The enzyme responsible for initiating DNA replication in prokaryotes is :
- a) DNA polymerase I                                    b) DNA polymerase III  
c) Polymerase beta                                      d) Primase
- 28) Which components of cell help in the manufacturing of new biological products?
- a) Carbohydrates                                      b) Proteins  
c) Lipids    d) Nucleic acids
- 29) Antibiotics such as Ciprofloxacin and Flouroquinolines work by inhibiting a specific enzyme. This enzyme is normally necessary to relieve torsional strain that is caused by the unwinding of the helix. What is the name of this enzyme?
- a) DNA ligase    b) Topoisomerase (DNA Gyrase)  
c) Single-stranded binding protein              d) Primase
- 30) Which of the following are true about bacterial superoxide dismutase?
- P. Present in obligate aerobes  
Q. Present in facultative anaerobes  
R. Present in aerotolerant anaerobes  
S. Absent in obligate aerobes
- a) Pand Q only    b) P, Q and R only  
c) P and R only                                        d) Q and S only

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- 31) Which of the following is true about Michaelis-Menten kinetics?
- a)  $K_m$ , the Michaelis constant, is defined as that concentration of substrate at which enzyme is working at maximum velocity
  - b) It describes single substrate enzymes
  - c)  $K_m$ , the Michaelis constant is defined as the dissociation constant of the enzyme- substrate complex
  - d) It assumes covalent binding occurs between enzyme and substrate
- 32) Two organisms which are very closely related to each other have which of the following property?
- a) similar mol% G+C values
  - b) different mol% G+C values
  - c) similar mol% G+C values and heteroduplexes are formed
  - d) different mol% G+C values and heteroduplexes are not formed
- 33) Bdellovibrios come under which group of microorganisms?
- a) Viruses
  - b) Bacteria
  - c) Fungi
  - d) Algae
- 34) Under alkaline conditions, DNA is more stable than RNA because
- a) RNA forms secondary structures
  - b) RNA is a single stranded molecule
  - c) RNA has uracil in place of thymidine
  - d) RNA is susceptible to hydrolysis
- 35) The RNA primer synthesized during the replication process in bacteria is removed by
- a) DNA gyrase
  - b) primase
  - c) DNA polymerase I
  - d) DNA polymerase II

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- 36) “Each batch of newly preserved cultures should be routinely checked to ensure their quality”. Who outlined the statement?
- a) Lincoln
  - b) Snell
  - c) Malik
  - d) Pridham
- 37) Which of the following does not describe dynamic programming?
- a) The approach compares every pair of characters in the two sequences and generates an alignment, which is the best or optimal
  - b) Global alignment algorithm is based on this method
  - c) Local alignment algorithm is based on this method
  - d) The method can be useful in aligning protein sequences to protein sequences only
- 38) A 10-year-old boy comes to the ER after eating wild mushrooms. The poison associated with these mushrooms most likely DIRECTLY inhibits the synthesis of the following :
- a) hn RNA
  - b) t RNA
  - c) DNA
  - d) m RNA
- 39) Which of the following technique(s) can be used to study conformational changes in myoglobin?
- P. Mass spectrometry
  - Q. Fluorescence spectroscopy
  - R. Circular dichroism spectroscopy
  - S. Light microscopy
- a) P only
  - b) P and S only
  - c) Q and R only
  - d) S only
- 40) In leguminous plants, both the rhizobium genes and the plant genes influence nodulation and nitrogen fixation. Which one of the following functions is NOT encoded by the host plant genes?
- a) Production of inducers that modify rhizobial cell wall
  - b) Production of flavonoid inducers
  - c) Establishment of contact between bacteria and legume
  - d) Root hair curling



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- 41) Which one of the combinations of the following statements is true about antibody structure?
- P. Limited proteolysis of rabbit IgG with the enzyme pepsin generates two antigen-binding regions (Fab) and an Fc fragment
  - Q. Limited proteolysis of rabbit IgG with the enzyme papain generates a single bivalent antigen-binding region F(ab')<sub>2</sub> and peptide fragments
  - R. The Fc fragment of IgG can self-associate and crystallize into a lattice
  - S. The F(ab')<sub>2</sub> fragment of IgG is composed of both light and heavy chains
- a) P and Q only
  - b) P and R only
  - c) R and S only
  - d) Q and S only
- 42) In a chemical reaction, the rate of reaction is independent of the reactant concentration, what is it called what?
- a) Zero order reaction
  - b) First order reaction
  - c) Second Order reaction
  - d) None of the mentioned
- 43) How can be citric acid produced other than from lemons?
- a) Aerobic fermentation of starch
  - b) Anaerobic fermentation of starch
  - c) Aerobic fermentation of glucose
  - d) Anaerobic fermentation of glucose
- 44) If the molar amount of G in a DNA sample is 20%, what is the molar amount of T in the sample?
- a) 20%
  - b) 30%
  - c) 40%
  - d) 60%
- 45) Which of the following is untrue about Essential Fatty Acids?
- a) EFAs are also called Vitamin F
  - b) EFAs can be synthesized by the body
  - c) EFAs cannot be synthesized by the body
  - d) Omega-3 and Omega-6 are the two families of EFAs

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- 46) Which scientists gave the details of the techniques of preservation?
- a) Jacob and Monod
  - b) Kirsop and Doyle
  - c) William and Wilkins
  - d) Boliver and Rodriguez
- 47) Which statement out of the following is incorrect about the effect of increasing temperature on enzyme activity
- a) Raising the temperature increases the kinetic energy of molecules
  - b) Aten degree Centigrade rise in temperature will increase the activity of most enzymes by 50 to 100%
  - c) Most animal enzymes rapidly become denatured at temperatures above 40°C
  - d) Storage of enzymes at 5°C or below is generally not suitable.
- 48) For dimensional consistency each term in an equation must have the same net dimension and unit as every other term to which it is added or subtracted or equated. The above given statement is
- a) False
  - b) True
  - c) Not mandatory
  - d) None of the mentioned
- 49) Economic output and investment of different types of biotechnologies is known as
- a) Bioremediation
  - b) Biodegradation
  - c) Bio economic
  - d) Bioleaching
- 50) A 42-year-old obese female presented to the emergency center with complaints of worsening nausea, vomiting, and abdominal pain. Her pain was located in the mid epigastric area and right upper quadrant. Blood biochemistry revealed high serum amylase level. What is the probable diagnosis for this patient?
- a) Viral hepatitis
  - b) Acute Pancreatitis
  - c) Renal colic
  - d) Acute gastritis



**Rough Work**

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