

ENTRANCE EXAMINATION FOR ADMISSION, MAY 2012.

Ph.D. Biochemical Pharmacology

COURSE CODE : 162

Register Number :

*Signature of the Invigilator
(with date)*

COURSE CODE : 162

Time : 2 Hours

Max : 400 Marks

Instructions to Candidates :

1. Write your Register Number within the box provided on the top of this page and fill in the page 1 of the answer sheet using pen.
2. Do not write your name anywhere in this booklet or answer sheet. Violation of this entails disqualification.
3. Read each of the question carefully and shade the relevant answer (A) or (B) or (C) or (D) in the relevant box of the ANSWER SHEET using HB pencil.
4. Avoid blind guessing. A wrong answer will fetch you -1 mark and the correct answer will fetch 4 marks.
5. Do not write anything in the question paper. Use the white sheets attached at the end for rough works.
6. Do not open the question paper until the start signal is given.
7. Do not attempt to answer after stop signal is given. Any such attempt will disqualify your candidature.
8. On stop signal, keep the question paper and the answer sheet on your table and wait for the invigilator to collect them.
9. Use of Calculators, Tables, etc. are prohibited.

1. The number of moles of the substrate converted to product per second per mole of enzyme is known as
 - (A) Turnover number
 - (B) Katal
 - (C) Kcat
 - (D) Km

2. From the double reciprocal plot of an enzyme – catalyzed reaction, the 'y' intercept has been found to be 'c' and the slope has been found to be 'd'. The Km value can be calculated by
 - (A) d/c
 - (B) c/d
 - (C) cd
 - (D) c-d

3. Which amino acid residue at the active site of an enzyme is most effective as a participant in general acid base catalysis?
 - (A) Aspartic acid
 - (B) Glutamic acid
 - (C) Histidine
 - (D) Cysteine

4. Which among the following is **FALSE** regarding reversible competitive inhibition?
 - (A) The inhibitor is a substrate analogue
 - (B) The apparent Km increases
 - (C) The Vmax remains the same
 - (D) The slope of double reciprocal plot decreases

5. What is the name given to an enzyme inhibitor which is (1) a substrate analogue (2) possesses a highly reactive group that is not present on the natural substrate (3) covalently modifies a hyperactive amino acid residue at the active site?
 - (A) Affinity label
 - (B) Mechanism – based inhibitor
 - (C) Suicide inhibitor
 - (D) Transition – state analogue

6. Allosteric enzymes are characterized by the following **EXCEPT**:
 - (A) They inhibit the earliest functionally irreversible steps of metabolic pathways.
 - (B) They are oligomeric proteins
 - (C) Their kinetics can be followed by Michaelis – Menten formalism
 - (D) They exhibit cooperativity

7. Covalent modification of enzyme activity DIFFERS from allosteric modification in which among the following aspects?
- (A) Provides short – term regulation of metabolic flow
 (B) Does not alter gene expression
 (C) Acts at an allosteric rather than a catalytic site
 (D) Involves several proteins
8. Isozymes can differ in the following EXCEPT:
- (A) Kinetic constants (B) Resistance to denaturing agents
 (C) Susceptibility to inhibitors (D) The biochemical reactions they catalyze
9. An example for ping pong reaction during enzyme catalysis is
- (A) Hexokinase (B) Transaminase
 (C) Malate dehydrogenase (D) Creatine kinase
10. Which among following enzymes is the most sensitive index of early viral hepatitis?
- (A) GGT (B) AST
 (C) ALT (D) Alkaline phosphatase
11. Which among the following is TRUE regarding plasma **non- functional enzymes**?
- (A) They are present in blood at higher concentrations than in tissues
 (B) Their substrates are always present in blood.
 (C) Their plasma concentration can rise as a result of increased synthesis within cells
 (D) They have specific functions to perform in the blood.
12. Which among the following drug is an inhibitor of xanthine oxidase?
- (A) Dicoumarol (B) Allopurinol
 (C) Penicillin (D) Trimethoprim
13. The unit of radioactivity, One Curie (Ci) is equivalent to how many disintegrations per per second (dps)?
- (A) 3.7×10^3 (B) 3.7×10^4
 (C) 3.7×10^7 (D) 3.7×10^{10}

- (14.) Which among the following radio isotopes is used in the Radio Immuno Assay of Hormones?
- (A) ^{14}C (B) ^{32}P (C) ^{125}I (D) ^{131}I
15. Which among the following type of electrophoresis is useful for the determination of protein subunit molecular weight?
- (A) Isoelectric focusing
(B) High voltage
(C) Sodium Dodecyl Sulphate Polyacrylamide Gel
(D) Capillary
16. Which form of chromatography is useful for the determination of protein molecular weight?
- (A) Ion exchange (B) Gel filtration
(C) Affinity (D) Adsorption
17. Which among the following compounds is neither reabsorbed nor secreted by the renal tubules?
- (A) Uric acid (B) Urea
(C) Sodium (D) Creatinine
18. Balanced diet should contain calories from carbohydrate, proteins and fat in the ratio of
- (A) 40:30:30 (B) 50:30:20
(C) 60:20:20 (D) 70:20:10
19. Which among the following Clinical Biochemistry reports indicate Diabetes mellitus?
- (A) Fasting plasma glucose is 125mg/dl
(B) 2-hr post-glucose load value of oral glucose tolerance test is 205mg/dl
(C) Random plasma glucose level is 190mg/dl
(D) 1-hr post-glucose load value or oral glucose tolerance test is 180mg/dl

20. Which among the following methods of protein estimation is based on scattering of light?
- (A) Nephelometry (B) Kjeldahl's
(C) Lowry's (D) Enzyme linked immunosorbent assay
21. Theophylline toxicity:
- (A) Is manifest at plasma levels 20-40 mg/litre
(B) May result in hypotonia
(C) Can be avoided in congestive heart failure by decreasing the loading dose
(D) None of the above
22. Sodium cromoglycate:
- (A) Antagonises the effects of the chemical mediators in asthma
(B) Has useful bronchodilating properties
(C) Is of little benefit in late onset asthma
(D) Is not effective in the prevention of exercise-induced asthma
23. Ipratropium bromide:
- (A) Is a more lipid soluble derivative of atropine
(B) Unlike atropine does not inhibit mucociliary clearance
(C) Acts more rapidly than beta-adrenoceptor agonists in the relief of asthmatic symptoms
(D) Is contraindicated in patients with glaucoma
24. Nedocromil sodium:
- (A) Shows greater anti-inflammatory effects than cromoglycate
(B) Is ineffective against exercise-induced asthma
(C) Is as potent as inhaled steroids in the treatment of asthma
(D) Causes sedation

25. Thiopentone:
- (A) Offers significant cerebral protection if used in resuscitation from cardiac arrest
 - (B) Is useful for cerebral protection for valvular surgery using extracorporeal circulation
 - (C) In clinically used anaesthetic doses produces the same degree of reduction in cerebral metabolic oxygen requirement as colling to 28°C.
 - (D) Administration over a prolonged period of time is beneficial in controlling intracranial pressure after head injury
26. The following may be associated with convulsant activity in susceptible individuals:
- (A) Etomidate
 - (B) Fentanyl
 - (C) Propofol
 - (D) All of the above
27. Among the barbiturate anaesthetic agents:
- (A) Thiopentone has been linked to convulsions in non-epileptic patients
 - (B) Thiopentone will induce seizure activity in temporal lobe epilepsy
 - (C) Thiopentone infusions have been used for days to control status epilepticus.
 - (D) None of the above
28. Thiopentone:
- (A) Has a terminal elimination half-life, which is approximately three times its distribution half-life
 - (B) Will show zero order kinetics at high doses
 - (C) Crosses the blood-brain barrier in much reduced quantities in acidosis
 - (D) Shows a prolonged elimination half-life in renal failure
29. Ketamine:
- (A) Is solubilized in ethylene glycol
 - (B) Decreases the pulmonary artery pressure in spite of ncreasing the systemic arterial pressure
 - (C) Exists as enantiomers which differ in anaesthetic potency
 - (D) Is not effective when given orally because of extensive first-pass metabolism

30. Ketamine:
- (A) Has no analgesic effects at subanesthetic doses
 - (B) Has no effect on intrathecal administration
 - (C) Causes sialorrhoea
 - (D) All of the above
31. Propofol:
- (A) Has a similar initial distribution half-life as thiopentone
 - (B) Has a rate of clearance twice that of thiopentone
 - (C) Has no antianalgesic effect
 - (D) None of the above
32. Propofol
- (A) Is contraindicated in porphyria
 - (B) Is approximately half as potent as thiopentone
 - (C) Produces retrograde amnesia
 - (D) Causes more cardiovascular depression than thiopentone
33. Propofol:
- (A) Is 98 per cent protein bound in the blood stream
 - (B) Clearance is markedly reduced in cirrhosis of liver
 - (C) Has a markedly prolonged elimination half-life in the elderly
 - (D) Non of the above
34. Etomidate:
- (A) Is a carboxylated ether derivative
 - (B) Is not water soluble
 - (C) Administration is complicated by significant thrombophlebitis
 - (D) Is not highly protein bound

35. Etomidate:
- (A) Administration results in an increase of intracranial pressure secondary to myoclonus
 - (B) Administration produces an increase in intraocular pressure secondary to myoclonus
 - (C) Causes a decrease in heart rate
 - (D) Causes minimal changes in systemic vascular resistance
36. Etomidate:
- (A) Myoclonus is not decreased by pretreatment with benzodiazepines
 - (B) Causes less respiratory depression than methohexitone
 - (C) Causes an irreversible inhibition of 11 beta-hydroxylation reactions leading to an inhibition of 11 beta-hydroxylation reactions leading to an inhibition of steroidogenesis
 - (D) Kinetics are unaltered during high-dose fentanyl anaesthesia
37. Atracurium:
- (A) Is a bisquaternaryaminosteroid with an intermediate duration of action
 - (B) Has the advantage of being completely metabolized by the process of Hofmann elimination
 - (C) Produces cutaneous flushing in a dose-related manner
 - (D) Unlike vecuronium may increase the intraocular pressure
38. The following drugs can prolong non-depolarizing neuromuscular blockade:
- (A) Neomycin
 - (B) Theophylline
 - (C) Azathioprine
 - (D) None of the above
39. The effect of tubocurarine is potentiated by:
- (A) Alkalosis
 - (B) Mild hypothermia
 - (C) Hypokalaemia
 - (D) All of the above
40. Suxamethonium
- (A) Will trigger malignant hyperthermia only in humans
 - (B) Has no effect on autonomic ganglia
 - (C) Induced myalgia has no relation to the degree of fasciculations
 - (D) Has no active metabolites

41. The most frequently occurring number in a set of values is called the
(A) Mean (B) Median (C) Mode (D) Range
42. Which of the following is used to explain or predict the values of a dependent variable based on the values of one or more independent variables?
(A) Regression analysis (B) Regression coefficient
(C) Regression equation (D) Regression line
43. The _____ is often the preferred measure of central tendency if the data are severely skewed.
(A) Mean (B) Median (C) Mode (D) Range
44. If a distribution is skewed to the left, then it is
(A) Negatively skewed (B) Positively skewed
(C) Symmetrically skewed (D) Symmetrical
45. What would happen (other things equal) to a confidence interval if you calculated a 99 percent confidence interval rather than 95 percent confidence interval?
(A) It will be narrower (B) It will not change
(C) The sample size will increase (D) It will become wider
46. What is the standard deviation of a sampling distribution called?
(A) Sampling error (B) Sample error
(C) Standard error (D) Simple error
47. 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
48. The use of the laws of probability to make inferences and draw statistical conclusions about populations based on sample data is referred to as
(A) Descriptive statistics (B) Inferential statistics
(C) Sample statistics (D) Population statistics
49. A statistical test used to compare 2 or more group means is know as
(A) One-way analysis of variance (B) Post hoc test
(C) T-test for correlation coefficients (D) Simple regression

50. A Type II error is also known as a
- (A) False positive (B) False negative
(C) Double negative (D) Positive negative
51. What is the cyclical process of collecting and analyzing data during a single research study called?
- (A) Interim analysis (B) Inter analysis
(C) Inter-item analysis (D) Constant analysis
52. The process of marking segments of data with symbols, descriptive words, or category names is known as
- (A) Concurring (B) Coding
(C) Coloring (D) Segmenting
53. 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
54. When referencing other works you have cited within the text of the report you should
- (A) State the first and last name of the author
(B) Use the author, date citation method
(C) Use an asterisk and a footnote
(D) Insert the complete citation in parenthesis
55. Where do you provide a step-by-step account of what the researcher and participants did during the research study?
- (A) Introduction (B) Abstract
(C) Methods (D) Design
56. Which of the following is necessary in obtaining informed consent?
- (A) A description of the statistical analyses that will be carried out
(B) A description of the purpose of the research
(C) A description of the reliability and validity of test instruments
(D) A list of publications that the researcher has had in the last ten years.

57. What is the over-riding principle governing ethical research behaviour?
- (A) To protect research participants from harm
 - (B) To avoid dealing with sensitive topics
 - (C) To obtain informed consent of the participants
 - (D) To preserve the anonymity of the participants
58. 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) Comparativism
59. Which of the following is not an ethical guideline for conducting research with humans?
- (A) Getting informed consent of the participant
 - (B) Telling participants they must continue until the study has been completed
 - (C) Keeping participant's identity anonymous
 - (D) Telling participants they are free to withdraw at any time
60. Concerning "authorship" in educational research, intellectual ownership is predominantly a function of:
- (A) Effort expended
 - (B) Creative contribution
 - (C) Professional position
 - (D) Level of higher education
61. The following are certain behavioral traits that distinguishes creative individuals from their peers EXCEPT:
- (A) High level of curiosity
 - (B) Unwillingness to learn from experience
 - (C) Preparedness to take risks
 - (D) Persistence in situations of failure
62. Creative thinking differs from critical thinking in which among the following components?
- (A) Analytical
 - (B) Judgemental
 - (C) Selective
 - (D) Divergent

63. Which among the following is an inhibitor of creativity?
 (A) Belief in creativity (B) Recording of ideas
 (C) Irregular practice of creative thinking (D) Realistic expectations
64. In medical research, "the points we want to reach in a study or in a clinical trial" is known as
 (A) Research problem (B) Research objectives
 (C) Research hypothesis (D) Research question
65. "A proposition to be evaluated, accepted or rejected by research study and its results" is known as
 (A) Research problem (B) Research objectives
 (C) Research hypothesis (D) Research question
66. "A tentative explanation for a phenomenon used as a basis for further investigation" is known as
 (A) Research problem (B) Research objectives
 (C) Research hypothesis (D) Research question
67. "An expression of doubt and uncertainty about the nature and solution of a health problem in specific context" is known as
 (A) Research problem (B) Research objectives
 (C) Research hypothesis (D) Research question
68. In biomedical research, "the group for comparison allowing the establishment of contrasts as a measure of the success of treatment" is known as
 (A) Control (B) Population
 (C) Test (D) Setting
69. "There will be statistically significant improvement between depressed men and women after cognitive therapy compared with fluoxetine". This statement is an example of which type of hypothesis?
 (A) One-tailed alternative (B) Two-tailed alternative
 (C) One-tailed null (D) Two-tailed null
70. A study was carried out in a population to determine the frequency of a disease, the kind of people suffering from it and the distribution of attributes at one point in time. This type of study is known as
 (A) Cross sectional analytical (B) Longitudinal experimental
 (C) Cross-sectional descriptive (D) Longitudinal qualitative

71. A study which determines why one particular group or person is affected by a disease while another is not is known as
- (A) Qualitative (B) Analytical
(C) Experimental (D) Descriptive
72. The following are disadvantages of self-completion questionnaire used in a survey when compared to other methods EXCEPT:
- (A) The responses rates can be low
(B) Inappropriate for populations with high levels of illiteracy
(C) It need to be short and needs to be in simple language
(D) The barriers of embarrassment in collection of sensitive data is more
73. The following are the advantages of face-to-face interviews carried out in a survey EXCEPT:
- (A) Useful in populations with high levels of illiteracy
(B) Provides clarification and deals with misunderstandings
(C) Easier collection of sensitive data
(D) Ensures almost complete collection of information
74. Which type of sampling is most appropriate when interviews are undertaken in a survey?
- (A) Random (B) Probability (C) Systematic (D) Cluster
75. In a study, sampling was carried out at every fourth house. Name the sampling technique involved?
- (A) Random (B) Probability (C) Systematic (D) Cluster
76. Which among the following statements denote reproducibility of results in biochemical assays?
- (A) Accuracy (B) Precision (C) Specificity (D) Sensitivity
77. Which among the following is a free bibliographic software currently available in the market?
- (A) Zotero (B) Bibloscope (C) Bookend (D) Endnote
78. Which among the following is the most commonly used measure of the quality of a journal?
- (A) Evaluation by peers (B) The ISI impact factor
(C) Index in major biomedical databases (D) Good public relation services

79. The ISI 2009 impact factor (IF) of a journal is calculated by the following equation, $IF = \frac{\text{No. of citations in 2008 of articles published in 2006 and 2007}}{X}$ where X is the total no. of articles published in
- (A) 2005 and 2006 (B) 2006 and 2007
(C) 2007 and 2008 (D) 2008 and 2009
80. The following are the Rs of Russell and Burch's ethical foundation in carrying out animal experiments EXCEPT:
- (A) Rehabilitation (B) Replacement (C) Reduction (D) Refinement
81. The 'replacement' in animal research refers to
- (A) Use of non-animal research methods where possible
(B) Replacement of weak and sick animals with healthy ones
(C) Use of evolutionarily higher animals instead of lower animals
(D) Replacement of aggressive animals with mild ones
82. What is the ethical foundation of W.M.S. Russell and R.L. Burch's three 'R's practiced in animal experiments?
- (A) Causing pain and distress in animals for any purpose in research is wrong
(B) The research should be of sufficient weight to justify any pain and distress caused
(C) The pain and distress of animals is overlooked when research of any relevance has to be carried out
(D) Animal experiments are permitted if it causes only mild pain and distress to the animals
83. The following statements are in agreement with the 'reduction' practiced in animal experiments EXCEPT
- (A) Avoid unnecessary duplication of studies
(B) Reduce animals to the minimum to achieve significant results
(C) Use of each animal must be justified
(D) Arbitrary reduction of numbers as much as possible even if it results in insignificant results
84. Which among the following statements is FALSE regarding the ethics of medical research among children?
- (A) Children can be involved in research that could be carried out equally well with adults
(B) A parent or legal guardian of each child has to give proxy consent
(C) The research should be conducted in settings in which the child and parent can obtain adequate medical psychological support
(D) The child's refusal to participate in research must always be respected unless there is no medically acceptable alternative

85. The value around which the observations tend to be most heavily concentrated in a study is known as:
 (A) Average (B) Mean (C) Median (D) Mode
86. The more important requirement for good research is
 (A) Quality of human resources in the laboratory
 (B) Good furniture and elegant building
 (C) Advanced equipments
 (D) Good library facility
87. The steps in the systematic
 (A) Formulate clear questions – selection of idea – identifying the problem – experimental design
 (B) Identifying the problem – selection of idea – formulate clear questions – experimental design
 (C) Formulate clear questions – identifying the problem – Selection of idea – experimental design
 (D) Selection of idea – identifying the problem – formulate clear questions – experimental design
88. A research finding may be tentatively accepted to be scientifically true provided the probability is at least greater than
 (A) 65% (B) 85% (C) 95% (D) 75%
89. The following statement about “hypothesis” is correct
 (A) Hypothesis is a formal statement of expected answer
 (B) Hypothesis can not predict a relationship between known facts
 (C) Hypothesis is essential even if you want to build a data base
 (D) Hypothesis can not be tested
90. The sampling method in which every member of the population has an equal chance of being selected for the study is called
 (A) Systematic sampling (B) Incidental sampling
 (C) Random sampling (D) Convenience sampling
91. Animal ethics committee permission is NOT needed for the following experiment
 (A) Cell and tissue culture study
 (B) Experiments done in small animals
 (C) Experiments done for studies of national interest
 (D) Repetition of experiments
92. The term “principal outcome measures” is also called
 (A) Independent variable (B) Extraneous variable
 (C) Dependent variable (D) Internal variable

93. Which one of the following study is experimental research?
- (A) Measurement of hemoglobin level in normally nourished women during pregnancy
- (B) Finding the prevalence of diabetes mellitus among those above 20 years of age in Pondicherry
- (C) Whether the risk for lung disease is increased by smoking or stress.
- (D) Finding the frequency of liver dysfunction in alcoholics
94. The following statement is correct about the 'Lead-in period' in a research study
- (A) It is provided near the end of the study
- (B) During lead-in period neither group receives intervention
- (C) Does not eliminate the dissimilarities between groups
- (D) Help to generate preliminary data
95. A visual impression of the degree and direction of relationship between 2 variables is obtained with
- (A) Bar graph (B) Scatter plot
- (C) Pie diagram (D) Frequency polygon
96. The discrete data is best depicted in a
- (A) Bar graph (B) Histogram
- (C) Pie diagram (D) Frequency polygon
97. The most commonly used measure of dispersion is
- (A) Mean (B) Median
- (C) Mode (D) Standard deviation
98. The formula used for co-efficient variation is:
- (A) $(\text{Standard deviation}/\text{mean}) \times 100$ (B) $(\text{Standard error of mean}/\text{mean}) \times 100$
- (C) $(\text{Variance}/\text{mean}) \times 100$ (D) $(\text{Confidence interval}/\text{mean}) \times 100$
99. The power desired in a study is essential for calculation of
- (A) Standard error of mean (B) Confidence interval
- (C) Sample size (D) Statistical significance
100. Kaplan-Meier analysis suitable for
- (A) Relative risk analysis (B) Survival analysis
- (C) Absolute risk analysis (D) Odds ratio.