Roll No. .....

Question Booklet Number

O. M. R. Serial No. | | | | | | | | |

M. Sc. (Biotechnology) (Fourth Semester)

EXAMINATION, July, 2022

(Elective)

DRUG DISCOVERY & DEVELOPMENT

Paper Code					
MBT	4	0	0	3	(C)

Questions Booklet Series
A

Time : 1:30 Hours] [*Maximum Marks : 100*

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 60 questions. Examinee is required to answer any 50 questions in the OMR Answer-Sheet provided and not in the question booklet. If more than 50 questions are attempted by student, then the first attempted 50 questions will be considered for evaluation. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 60 प्रश्न हैं। परीक्षार्थी को किन्हीं 50 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। यदि छात्र द्वारा 50 से अधिक प्रश्नों को हल किया जाता है तो प्रारम्भिक हल किये हुए 50 उत्तरों को ही मूल्यांकन हेतु सम्मिलित किया जाएगा। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, तो उसे तुरन्त बदल लें।

(Remaining instructions on the last page) (शेष निर्देश अन्तिम पृष्ठ पर)

1. The considered 'Ligand-based drug designing' amongst the following approach is ..... .

(A) Pharmacophore modelling

(B) QSAR Modeling

(C) Molecular docking

(D) Both (A) and (B)

2. Who makes the active components of medicines ?

(A) Pharmacists

(B) Chemists

(C) Doctors

(D) Pharmacologists

3. QSAR methods involve :

(A) Ligand properties

(B) Target properties

(C) Ligand X-Ray structure

(D) Target structure

4. FDA is an acronym for :

(A) Food and Drug Act

(B) Food and Drug Administration

(C) Federal Department of Drug Administration

(D) Federal Drug Association

5. The safety assessment of the drugs in humans is studied in :

(A) Phase I

(B) Phase II

(C) Phase III

(D) Phase IV

6. The studies that test a marketed drug in new age groups or patient types are done :

(A) Post-approval

(B) Pre-approval

(C) During approval

(D) Such study never done

7. In the process of the drug discovery the first step is :

(A) Lead Optimization

(B) Lead Modification

(C) Lead Identification

(D) Lead Validation

8. The drug identified by the metabolite-based study is :

(A) Insulin

(B) Warfarin

(C) Meperidine

(D) Isoniazid

9. The requests submitted to appropriate regulatory authorities for permission to conduct investigational research include one of the following :

(A) NCE

(B) CMC

(C) IND

(D) IRB

10. Random screening led to the discovery of which drug among the following ?

(A) Morphine

(B) Zidovudine

(C) Penicillin

(D) Paracetamol

11. In the 3D QSAR, red regions indicate favourable points for :

(A) Electron-deficient groups

(B) Electron-rich groups

(C) Smaller groups

(D) Bulky groups

12. The QSAR technique performed manually is :

(A) Hansch approach

(B) Free Wilson approach

(C) Fujita Ban approach

(D) Topliss approach

13. Which of the following analytical techniques is not useful in combinatorial synthesis ?

(A) HPLC-MS

(B) LC-MS

(C) IR-MS

(D) GC-MS

14. Which of the following methods of tagging is not used in pool and split synthetic methods ?

(A) Radioactive labelling

(B) Chemical tagging

(C) Radiofrequency chip tagging

(D) Barcoding

15. Which of the following processes is not involved in the solid-phase synthesis of peptides ?

(A) Deprotection

(B) Cyclization

(C) Cleavage

(D) Coupling

16. In Drug discovery HTS stands for :

(A) High Target Screening

(B) High-through Screening

(C) High-throughput Screening

(D) High-end Target Screening

17. Identify the kind of interactions that are typically involved in binding a drug to the binding site of a protein.

(A) predominantly Van der Waals interactions

(B) predominantly ionic bonds

(C) predominantly hydrogen bonds

(D) a combination of all of the above

18. What is the term used for the automated *in vitro* testing of large numbers of compounds using genetically modified cells ?

(A) A complex bioassay

(B) Target identification

(C) High-throughput screening

(D) Surface Plasmon Resonance

19. In the QSAR which is not used ?

(A) Topological polar surface area

(B) Partition coefficient

(C) Molecular connectivity index

(D) Molecular similarity index

20. ..... is used to detect and amplify an antigen-antibody reaction.

(A) Calorimetric biosensor

(B) Optical biosensor

(C) ELISA

(D) Potentiometric biosensor

21. Which of the following is not a requirement of a combinatorial chemistry reaction ?

(A) Formation of a covalent bond between building blocks

(B) Suitability for large-scale reaction

(C) High yield

(D) Readily available building blocks

22. Which one is the application of bioinformatics ?

(A) Design of primers

(B) Grouping of proteins into families

(C) Reconstructing genes from EST sequences

(D) All of the above

23. What is the term used for an animal that has been genetically modified for in vivo tests ?

(A) Hybrid animal

(B) Transgenic animal

(C) Chimeric animal

(D) Transformed animal

24. What is meant by ADME in pharmacokinetics ?

(A) Affinity, dosage, marketing, efficacy

(B) Agonism, dependence, mobility, efficiency

(C) Absorption, distribution, metabolism, excretion

(D) Antagonism, deficiency, mean, efflux

25. Which of the following terms is used to describe a drug that has the same effect on a receptor as the endogenous chemical messenger ?

(A) Antagonist

(B) Agonist

(C) Inverse agonist

(D) Partial agonist

26. The false statement among the following regarding the blood brain barrier ?

(A) The walls of the capillaries supplying the brain have tight fitting cells making it difficult for polar drugs to leave the capillaries.

(B) The capillaries in the brain have a fatty coating making it more difficult for drugs to enter the brain.

(C) The walls of the capillaries supplying the brain are made up of several layers of cells, which act as a barrier to the release of drugs.

(D) Hydrophobic drugs pass through the blood brain barrier more easily than hydrophilic drugs.

27. What term is used to signify a preparation that appears identical to the preparation of an active drug but which has no biological activity ?

(A) Dummy drug

(B) Gazebo

(C) Peptidomimetic

(D) Placebo

28. The poor oral absorption has been known for ..... .

(A) Medroxyprogesteron

(B) Thiobarbital

(C) Progesterone

(D) Pentobarbitone

29. Agents act as irreversible inhibitors are ..... .

(A) protease inhibitors

(B) statins

(C) penicillins

(D) sulphonamides

30. Strategies that increase the polarity and water solubility of a drug is ..... .

(A) Replacing an alkyl group

(B) Replacing an aromatic ring

(C) Removing polar functional groups

(D) Adding extra alkyl groups

31. There are several sources and methods of discovering new compounds. Which of the following is an in silico method ?

(A) Database mining

(B) Combinatorial chemistry

(C) Me too drugs

(D) Screening plant extracts

32. What is a peptidomimetic ?

(A) A peptide lead compound that mimics the action of an endogenous neurotransmitter or hormone.

(B) A structure that has the ability to bind to peptides or proteins.

(C) A peptide that consists of unnatural amino acids rather than natural amino acids

(D) A structure that has been designed to mimic a peptide lead compound in binding to a target binding site, but has better pharmacokinetic properties.

33. Which of the following properties of a drug is most likely to result in a minimum of side effects ?

(A) Target selectivity

(B) Fast metabolism

(C) Good oral absorption

(D) Target affinity

34. If a manufacturing company does not adhere to CGMP regulations :

(A) No action will be taken, if the drugs are safe

(B) Any drug manufactured by such company will be considered "adulterated"

(C) The company will be closed instantly

(D) It means that there is necessarily something wrong with drug

35. The "c" in the "cGMP" stands for :

(A) Commitment

(B) Content

(C) Current

(D) Coupling

36. ..... is a part of a quality system covering the manufacture and testing of active ingredients and finished product.

(A) GLP

(B) GMP

(C) GHP

(D) None of the above

37. SOPs are used to ensure consistency in daily operations. SOP is acronym for :

(A) Sustainable Operating Procedure

(B) Safety Operating Procedure

(C) Special Operating Procedure

(D) Standard Operating Procedure

38. Which of the following analytical techniques provides the greatest structural information on a lead compound ?

(A) Ultra-violet spectroscopy

(B) Nuclear magnetic resonance spectroscopy

(C) Elemental analysis

(D) Infrared spectroscopy

39. Which of the following statements is correct for QA and QC ?

(A) QC is an integral part of QA

(B) QA is an integral part of QC

(C) QA and QC are independent to each other

(D) QC may or may not depend on QA

40. Match the following :

(a)	Quality assurance	(i)	Process oriented
(b)	Quality control	(ii)	National Physical Laboratory
(c)	Quality management	(iii)	Product Oriented
(d)	National measurement system	(iv)	Overall programmer of QA

(A) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)

(B) (a)-(ii), (b)-(iii), (c)-(i), (d)-(iv)

(C) (a)-(i), (b)-(iii), (c)-(iv), (d)-(ii)

(D) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)

41. According to WHO, QC is a part of ..... .

(A) GLP

(B) GCP

(C) GMP

(D) None of the above

42. Quality is :

(A) Meeting requirements

(B) Zero defects

(C) Customer satisfaction

(D) All of the above

43. Systems are audited after implementation to determine whether or not the system met standards. This is an example of :

(A) Detective control

(B) Quality control

(C) Quality assurance

(D) Corrective control

44. What is NIST ?

(A) National Institute of Science and Technology

(B) National Institute of Standards and Technology.

(C) National Institute for Software Technology

(D) National Institute for Software and Technology

45. Which are the four primary standards of ISO 9000 ?

(A) ISO 9000, ISO 9001, ISO 9004, ISO 10010

(B) ISO 9000, ISO 9001, ISO 9006, ISO 10011

(C) ISO 9000, ISO 9001, ISO 9004, ISO 10011

(D) ISO 9000, 150 9001, ISO 9004, ISO 10054

46. Which one of the following is the last step of a clinical trial process ?

(A) Investigator selection

(B) Patient recruitment

(C) Statistical Analysis

(D) Data filed and registration

47. Which one of the following will be checked under phase IV surveillance ?

(A) The whole market will be under surveillance

(B) 300-3000 peoples

(C) 20-300 peoples

(D) 20-50 peoples

48. Which of the following are not correct on the basis of clinical trials ?

(A) Biomedical research studies

(B) Behavioral research studies

(C) Studies on human subjects

(D) Study based only on animals

49. Which one of the following describes "double dummy" ?

(A) The subjects do not know which study treatment they receive

(B) Patients injected with placebo and active doses

(C) Fake treatment

(D) Signed document of the recruited patient for the clinical trial procedures

50. What is informed consent in a clinical trial ?

(A) The subjects do not know which study treatment they receive

(B) Patients injected with placebo and active doses

(C) Fake treatment

(D) Signed document of the recruited patient for the clinical trial procedures

51. Which of the following promotes excretion of acidic drugs ?

(A) Citrates

(B) Ammonium chloride

(C) Methionine

(D) Ascorbic acid

52. Which of the following will not be a factor governing the removal of substances through dialysis ?

(A) Molecular weight

(B) Water solubility

(C) Disintegration time

(D) Protein binding

53. Which kind of membrane is used in haemodialysis ?

(A) Natural semipermeable membrane of the peritoneal cavity

(B) Permeable membrane

(C) Artificial Semipermeable membrane

(D) Artificial permeable membrane

54. Which of the following bodies was not involved as a founder member of the International Conference on Harmonisation (ICH) ?

(A) The World Health Organization (WHO)

(B) European Federation of Pharmaceutical Industries and Associations

(C) European Commission

(D) Japanese Pharmaceutical Manufacturers Association

55. The basic steps that a new drug goes through with the Food and Drug Administration before it can be sold on the market are, in order :

(A) Lab and animal testing, submitting the NDA, preparing the IND, human clinical trials, approval

(B) Lab and animal testing, submitting the IND, human clinical trials, submitting the NDA, approval

(C) Submitting the IND, preparing the NDA, lab and animal testing, human clinical trials, approval

(D) Obtaining patent, performing human clinical trials, animal and lab testing, submitting the NDA and IND, approval

56. A drug that has the same active ingredient as a brand drug, but is usually cheaper, is called a ..... .

(A) Orphan drug

(B) Over-the-counter drug

(C) Generic drug

(D) Patented drug

57. MedWatch is part of the FDA's drug approval process. It is used to ..... .

(A) evaluate the drug's safety and report adverse events after it has been approved and is on the market.

(B) determine whether the drug is safe for consumers of all ages and ethnicities.

(C) determine whether or not the drug has a high potential for abuse and for street sales.

(D) determine whether the brand version of the drug is actually safer than the generic version.

58. Which of the following is the correct definition of bioavailability ?

(A) Bioavailability describes the proportion of the drug administered that is metabolised very quickly and thus is not available to induce a physiological effect.

(B) Bioavailability describes the ability of the administered drug metabolites to cause undesirable physiological effects.

(C) Bioavailability is used to describe the fraction of the dose of drug administered that is present within the body and facilitates the desired physiological effects.

(D) Bioavailability is the length of time an administered drug is present in the body and thus is available to cause a physiological effect.

59. What are adverse drug reactions (ADRs) ?

(A) The synergistic effects that are seen when some drugs are administered concurrently.

(B) Responses to increased drug doses required to achieve the same physiological outcome.

(C) Unintended alternative physiological responses caused by the drug that cause harm to the patient.

(D) Harmful chemical interactions between two drugs that are used to treat the same clinical symptoms.

60. Which statement about the process of drug discovery is true ?

(A) It only encompasses the non-clinical laboratory and animal testing.

(B) It is the process which ascertains the effectiveness and safety of potential drug candidates.

(C) It is the process by which therapeutic compounds are formulated into medicines.

(D) It ensures there are no side-effects associated with the potential drug candidates.

4. Four alternative answers are mentioned for each question as—A, B, C & D in the booklet. The candidate has to choose the most correct/appropriate answer and mark the same in the OMR Answer-Sheet as per the direction :

Example :

Question :

Q. 1 (A) ● (C) (D)
Q. 2 (A) (B) ● (D)
Q. 3 (A) ● (C) (D)

Illegible answers with cutting and over-writing or half filled circle will be cancelled.

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.

6. All answers are to be given on OMR Answer sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.

7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.

8. After the completion of the examination candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.

9. There will be no negative marking.

10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.

11. To bring and use of log-book, calculator, pager and cellular phone in examination hall is prohibited.

12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. : On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is ny discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर— A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से एक सबसे सही अथवा सबसे उपयुक्त उत्तर छाँटना है। उत्तर को OMR आन्सर-शीट में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)
प्रश्न 2 (A) (B) ● (D)
प्रश्न 3 (A) ● (C) (D)

अपठनीय उत्तर या ऐसे उत्तर जिन्हें काटा या बदला गया है, या गोले में आधा भरकर दिया गया, उन्हें निरस्त कर दिया जाएगा।

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।

6. सभी उत्तर केवल ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।

7. ओ. एम. आर. उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।

8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।

9. निगेटिव मार्किंग नहीं है।

10. कोई भी रफ कार्य, प्रश्न-पुस्तिका के अन्त में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।

11. परीक्षा-कक्ष में लॉग-बुक, कैलकुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।

12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण : प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्न-पुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्न-पुस्तिका प्राप्त कर लें।