INSTRUCTIONS TO CANDIDATES

(Use only blue/black ball-point pen in the space above and on both sides of the Answer Sheet)

1. Within 10 minutes of the issue of the Question Booklet, Please ensure that you have got the correct booklet and it contains all the pages in correct sequence and no page/question is missing. In case of faulty Question Booklet, Bring it to the notice of the Superintendent/Invigilators immediately to obtain a fresh Question Booklet.

2. Do not bring any loose paper, written or blank, inside the Examination Hall except the Admit Card without its envelope.

3. A separate Answer Sheet is given. It should not be folded or mutilated. A second Answer Sheet shall not be provided.

4. Write your Roll Number and Serial Number of the Answer Sheet by pen in the space provided above.

5. On the front page of the Answer Sheet, write by pen your Roll Number in the space provided at the top, and by darkening the circles at the bottom. Also, wherever applicable, write the Question Booklet Number and the Set Number in appropriate places.

6. No overwriting is allowed in the entries of Roll No., Question Booklet No. and Set No. (if any) on OMR sheet and Roll No. and OMR sheet no. on the Question Booklet.

7. Any change in the aforesaid entries is to be verified by the invigilator, otherwise it will be taken as unfair means.

8. This Booklet contains 40 multiple choice questions followed by 10 short answer questions. For each MCQ, you are to record the correct option on the Answer Sheet by darkening the appropriate circle in the corresponding row of the Answer Sheet, by pen as mentioned in the guidelines given on the first page of the Answer Sheet. For answering any five short Answer Questions use five Blank pages attached at the end of this Question Booklet.

9. For each question, darken only one circle on the Answer Sheet. If you darken more than one circle or darken a circle partially, the answer will be treated as incorrect.

10. Note that the answer once filled in ink cannot be changed. If you do not wish to attempt a question, leave all the circles in the corresponding row blank (such question will be awarded zero marks).

11. For rough work, use the inner back pages of the title cover and the blank page at the end of this Booklet.

12. Deposit both OMR Answer Sheet and Question Booklet at the end of the Test.

13. You are not permitted to leave the Examination Hall until the end of the Test.

14. If a candidate attempts to use any form of unfair means, he/she shall be liable to such punishment as the University may determine and impose on him/her.

Total No. of Printed Pages : 20
ROUGH WORK
No. of Questions : 50

Time : 2 Hours

Full Marks : 200

Note: (1) This Question Booklet contains 40 Multiple Choice Questions followed by 10 Short Answer Questions.

(2) Attempt as many MCQs as you can. Each MCQ carries 3 (Three) marks. 1 (One) mark will be deducted for each incorrect answer. Zero mark will be awarded for each unattempted question. If more than one alternative answers of MCQs seem to be approximate to the correct answer, choose the closest one.

(3) Answer only 5 Short Answer Questions. Each question carries 16 (Sixteen) marks and should be answered in 150-200 words. Blank 5 (Five) pages attached with this booklet shall only be used for the purpose. Answer each question on separate page, after writing Question No.

01. “Anubandha” is the synonym of :
   (1) Satwa
   (2) Atma
   (3) Ayu
   (4) Shareera

02. Rodhana comes under :
   (1) Parada dosha
   (2) Parada samskara
   (3) Rasa pujana
   (4) Rasa gathi

03. No plants survive in the surrounding of this species :
   (1) Ahiphena
   (2) Vishatinduka
   (3) Vatsanabha
   (4) Dhatura

04. Mahaguda is a variety of :
   (1) Pramcha pidaka
   (2) Kaphaja Krimi
   (3) Guda vidradhi
   (4) Bhagandhara

05. “Jentaka” is the sweda of choice in which of the following ritu ?
   (1) Vasanta
   (2) Varsha
   (3) Greeshma
   (4) Hemantha

P.T.O.
06. Charakopskara commentary on Charaka Samhita was written by :
   (1) Shivadas Scn  (2) Gangadhara Rai
   (3) Yogendranath Scn  (4) Chakrapani

07. In suspected Arsenic poison which part of the body is particularly preserved for chemical analysis ?
   (1) Heart  (2) Long bones
   (3) Skin  (4) Whole body

08. All of the following diseases are transmitted by faeco-oral route EXCEPT :
   (1) Cholera  (2) Poliomyelitis
   (3) Hepatitis A  (4) Hookworm

09. The most radio-sensitive tissue is :
   (1) Brain  (2) Bone marrow
   (3) Thyroid  (4) Liver

10. Which of the following is Vishishta purvaroopaa of Vataja Jwara ?
    (1) Angamarda  (2) Jrimbha
    (3) Agnimandya  (4) Aswedata

11. Allosteric effectors
    (1) bind to the ES complex and affect the rate of the reaction
    (2) covalently modify the enzyme
    (3) bind to the substrate altering the conformation
    (4) bind to a site on the enzyme distinct from the catalytic site

12. Enzymes affect the rates of chemical reactions by
    (1) displacing the equilibrium constant.
    (2) lowering the energy of activation of the reaction
    (3) decreasing the free energy change of the reaction
    (4) increasing the free energy change of the reaction
13. The $pI$ value of a protein is
   (1) the $pK$ value of a protein
   (2) the pH at which all the side chains have no charge
   (3) the pH at which the net charge of a protein is zero
   (4) equal to the sum of the $pK$'s of the alpha-amino and alpha-carboxy groups

14. Many metabolic reactions involve the transfer of electrons. Which of the following statements concerning electron transfer is TRUE?
   (1) NADH reducing equivalents are used mainly in the cytoplasm
   (2) A flavoprotein is an intermediate electron transport chain carrier between NADH and ubiquinone
   (3) NADPH is used as the primary electron carrier in electron transport
   (4) Cyanide blocks the transfer of electrons from NADH to ubiquinone

15. During uncontrolled diabetes, one of the factors producing hyperglycemia is gluconeogenesis. Which statement about gluconeogenesis is CORRECT?
   (1) Lactate and alanine can both serve as precursors of glucose carbons
   (2) Acetyl-CoA is used for the net synthesis of glucose
   (3) It occurs primarily in skeletal muscle
   (4) It occurs through reversal of all the reactions of glycolysis

16. Which of the following statements is FALSE?
   (1) Thermodynamically favored reactions are reversible
   (2) Nature favors low enthalpy and high entropy
   (3) Reactions can be driven in the favor of product formation by the presence of enzymes
   (4) At equilibrium there is no change in free energy
606/Medicinal Chemistry

17. Which of the following is true about a circular double-stranded DNA genome that is determined by chemical means to be 21% adenosine?
(1) The genome is 10.5% guanosine
(2) The genome is 21% guanosine
(3) The genome is 29% guanosine
(4) The genome is 58% guanosine

18. Which of the following is NOT involved in the processing of mRNA precursors in eukaryotic cells?
(1) Capping of the 5’ end
(2) Addition of poly A
(3) Splicing of exons
(4) Transport of the pre-mRNA to the cytoplasm

19. All of the following are known to involve a Ca²⁺-activated, vesicle-mediated secretory event EXCEPT
(1) constitutive secretion of collagen
(2) elevation of the fertilization membrane of the sea urchin
(3) synaptic transmission
(4) release of histamine from mast cells

20. If you were to compare the fatty-acid content of triacylglycerols in vegetable oil with those in butter, what general trends would you expect to find?
(1) Butter would contain a higher percentage of more highly polyunsaturated fatty acids than vegetable oil.
(2) Butter would contain a higher percentage of short, polyunsaturated fatty acids than vegetable oil.
(3) Butter would contain fatty acids of approximately the same length and degree of unsaturation as vegetable oil.
(4) Butter would contain a lower percentage of polyunsaturated fatty acids than vegetable oil.
21. Rifampicin is a/an
   (1) Anti-tubercular drug
   (2) Anti-viral drug
   (3) Anti-inflammatory drug
   (4) Anti-malarial drug

22. Which of the following amino acid or small peptides containing it, can be measured easily by UV?
   (1) Lysine
   (2) Valine
   (3) Tyrosine
   (4) Tryptophan

23. The pair of species with the same bond order is
   (1) NO, CO
   (2) N₂, O₂
   (3) O₂⁻, B₂
   (4) O₂⁺, NO⁺

24. Among the following mixtures, dipole-dipole as the major interaction, is present in
   (1) benzene and ethanol
   (2) acetonitrile and acetone
   (3) KCl and water
   (4) benzene and carbon tetrachloride

25. Solution A contains 7g/L of MgCl₂ and solution B contains 7g/L of NaCl. At room temperature, the osmotic pressure of
   (1) solution B is greater than A
   (2) both have same osmotic pressure
   (3) solution A is greater than B
   (4) can’t determine
26. Which of the following contains P-O-P bond?
   (1) Hypophosphorous acid
   (2) Phosphorous acid
   (3) Pyrophosphoric acid
   (4) Orthophosphoric acid

27. Which noble gas is most abundant in atmosphere?
   (1) He  (2) Ne  (3) Ar  (4) Kr

28. The number of water molecule(s) directly bonded to the metal centre in
    CuSO₄·5H₂O is
   (1) 1  (2) 2  (3) 3  (4) 4

29. (NH₄)₂Cr₂O₇ on heating gives a gas which is also given by
   (1) Heating NH₄NO₂
   (2) Heating NH₄NO₃
   (3) Mg₃N₂ + H₂O
   (4) Na (comp.) + H₂O₂

30. Anhydrous ferric chloride is prepared by
   (1) Dissolving Fe(OH)₃ in concentrated HCl
   (2) Dissolving Fe(OH)₃ in dilute HCl
   (3) Passing dry HCl over heated iron scrap
   (4) Passing dry Cl₂ gas over heated iron scrap

31. Which of the following reactions will not result in the formation of
    carbon-carbon bond?
   (1) Reimer-Tieman reaction
   (2) Friedel Crafts acylation
   (3) Wurtz reaction
   (4) Cannizzaro reaction
32. The appropriate reagent for the following transformation is

\[
\begin{array}{c}
\text{HO} \quad \text{CH}_3 \\
\text{O} \\
\text{HO} \quad \text{CH}_2\text{CH}_3
\end{array}
\]

(1) Zn(Hg), HCl
(2) \( \text{NH}_2\text{NH}_2 \), OH
(3) \( \text{H}_2\), Ni
(4) \( \text{NaBH}_4 \)

33. An oxygen containing organic compound upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is

(1) a ketone
(2) an aldehyde
(3) a primary alcohol
(4) a secondary alcohol

34. An organic (X) compound having molecular formula \( \text{C}_8\text{H}_{10} \) gives a dicarboxylic acid on reaction with alkaline \( \text{KMnO}_4 \) whereas after nitration X gives three mononitro derivatives. Compound X is

(1) Ethyl benzene
(2) o-Xylene
(3) m-Xylene
(4) p-Xylene
35. Compound which gives only one signal in PMR spectrum is
   (1)   Ethanol
   (2)   Acetic anhydride
   (3)   Acetaldehyde
   (4)   Acetic Acid

36. Compound which will not give iodoform test is
   (1)   Isopropanol
   (2)   Butan-2-ol
   (3)   Propanone
   (4)   Butan-1-ol

37. In a reaction, A+B→ Product, rate is doubled when the concentration of B is doubled, and rate increases by a factor of 8 when the concentrations of both reactants (A and B) are doubled. The rate for the reaction can be written as
   (1)   Rate = k [A] [B]
   (2)   Rate = k [A]^2 [B]
   (3)   Rate = k [A] [B]^2
   (4)   Rate = k [A]^2 [B]^2

38. Ene reaction involves
   (1)   4 p electrons electrocyclic reaction
   (2)   5 p electrons electrocyclic reaction
   (3)   6 p electrons electrocyclic reaction
   (4)   8 p electrons electrocyclic reaction
39. The reaction is an example of

\[
\begin{align*}
\text{Bu} & + \text{OMe} \quad \text{1.LDA} \quad \text{2.Ph-CHO} \\
& \quad \text{i-Pr} \quad \text{Li} \\
& \quad \text{Bu-} \quad \text{OH} \\
& \quad \text{Ph} \\
& \quad \text{Bu-}
\end{align*}
\]

(1) Aldol reaction
(2) Claisen-Schmidt condensation
(3) Hofmann-Loeffler reaction
(4) Diels-Alder reaction

40. Coniine is a/an

(1) Pyrrolidine alkaloid
(2) Piperidine alkaloid
(3) Pyrolizidine alkaloid
(4) Isoquinoline alkaloid
6CS/Medicinal Chemistry

Short Answer Questions

Note: Attempt any five questions. Write answer in 150-200 words. Each question carries 16 marks. Answer each question on separate page, after writing Question Number.

1. Deduce the structure of an unknown compound using the following 1H NMR spectrum, mass spectroscopy data, and IR spectrum.

1H NMR Spectrum: d1.30 (triplet, 6H) d4.29 (q quartet, 4H) d7.4-7.9 (multiplet, 4H) Mass Spectrum: m/e: Intensity: (as % of base peak) 222 10% 177 38% 149 100% IR Spectrum: Intensity (peak): Frequency (cm⁻¹): s 3100 m 2900 m 2800 s 1740 m-w 1600 m-w 1475 m 1465m 1450m 1375 s 1300-1000.

2. A compound having molecular formula C₆H₁₂ has some isomers. All the isomers upon monochlorination give monochloro derivatives. How you will distinguish all the isomers of C₆H₁₂ and their monochloro derivatives with the help of PMR spectroscopy?

3. Gama isomer of benzene hexa chloride does not give any type of ionic elimination reaction. Explain why?
4. Mentyl chloride reacts with sodium ethoxide in ethanol to give a single elimination product whereas neomenthyl chloride reacts with sodium ethoxide in ethanol to give two elimination products with 200 time slower rate than mentyl chloride. Explain why?

![Chemical structures](image)

Neomenthyl Chloride

Mentyl Chloride

5. Ozonolysis (O₃ in CH₂Cl₂) of compound A under reducing conditions (Zn/acetic acid) gives formaldehyde, 2-butanone, and compound B. Catalytic hydrogenation (H₂/Pd) of A gives 2,7- dimethylnonane. What is a possible structure for compound A?
6. Complete the following conversions in least steps:

1. \[\text{Conversion} \]

2. \[\text{Conversion} \]

7. What is the basis of separation in chromatography technique? Name different types of chromatography and describe one of them with a suitable example.

8. Differentiate between competitive and non-competitive inhibition of an enzymatic reaction. Explain why a large dose of ethanol is used to treat someone who accidentally swallows methanol.

9. What are ketone bodies? Where and when ketone bodies are formed in human body? What purpose ketone bodies serve in the human?

10. Describe the mechanism of action of peptide hormone.
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18
अभ्यासियों के लिए निर्देश

(इस पुस्तिका के प्रथम आवरण पृष्ठ पर तथा उत्तर-पत्र के दोनों पृष्ठों पर
 केवल नीली-काली बाल-प्लाइट पेन से ही लिखें)

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अंदर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद है और कोई प्रश्न छुट्टा नहीं है। पुस्तिका दोपुंशक प्रयोग से देखे जाने पर इसकी उच्च तकाल तक्ष-निरीक्षण को देखा सम्पूर्ण प्रश्नपत्र की दृष्टि पुस्तिका प्राप्त कर लें।

2. परीक्षा भवन में लिफामा रहित प्रवेश-पत्र के अतिरिक्त, लिखा या सादा कोई भी खुला कागज साथ में न लायें।

3. उत्तर-पत्र अलग से दिया गया है। इसे न तो मोड़ें और न ही विकृत करेंं। दूसरी उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही पूर्णांक किया जायेगा।

4. अपना अनुक्रमान तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निरीक्षित स्थान पर लिखें।

5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमान निरीक्षित स्थान पर लिखिये तथा नीचे दिखे उत्तर को गाढ़ा करें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का संबंध उद्धित स्थानों पर लिखें।

6. आयो एम.ए आरो नर पर अनुक्रमान संख्या, प्रश्नपुस्तिका संख्या तथा सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमान और आयो एम.ए आरो नर संख्या की प्रविष्टियों में उपरलिखित की अनुमान नहीं है।

7. उपरुक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षण द्वारा प्रमाणित होना चाहिए अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।

8. प्रश्न-पुस्तिका में प्रश्न के बारे में वैकल्पिक उत्तर दिये गये हैं। प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की संबंधित पंक्ति के सामने दिखे गये उत्तर को उत्तर-पत्र के प्रथम पृष्ठ पर दिखे गये निर्देशों के अनुसार पेन से गाढ़ा करना है।

9. प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अपना ही अपूर्ण भार से वह उत्तर स्वार्थ माना जायेगा।

10. प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अपना ही अपूर्ण भार से वह उत्तर स्वार्थ माना जायेगा।

11. सूत्र कार्य के लिए प्रश्न-पुस्तिका के सुखपृष्ठ के अंदर बाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।

12. परीक्षा के उपरांत केवल ओ आयो आरो उत्तर-पत्र परीक्षा भवन में हटा कर दें।

13. परीक्षा समाप्त होने से पहले परीक्षा भवन से वाहर जाने की अनुमति नहीं होगी।

14. यदि कोई अभ्यासी उत्तर परीक्षा में अनुमान साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निरीक्षित देखा जाएगा, भारी होगा।