

37

00006

Set No. : 1

Question Booklet No.

RET/15/TEST-B

606

Medicinal Chemistry

(To be filled up by the candidate by blue/black ball point pen)

Roll No.

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Roll No. (Write the digits in words)

Serial No. of OMR Answer Sheet

Day and Date

(Signature of Invigilator)

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.

SEAL

Total No. of Printed Pages : 20

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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) Prameha 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 |

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- 06.** Charakopskara commentary on Charaka Samhita was written by :
- (1) Shivadas Sen (2) Gangadhara Rai
(3) Yogendranath Sen (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 purvaroop of Vataja Jwara ?
- (1) Angamarda (2) Jrimbha
(3) Agnimandya (4) Aswcedata
- 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

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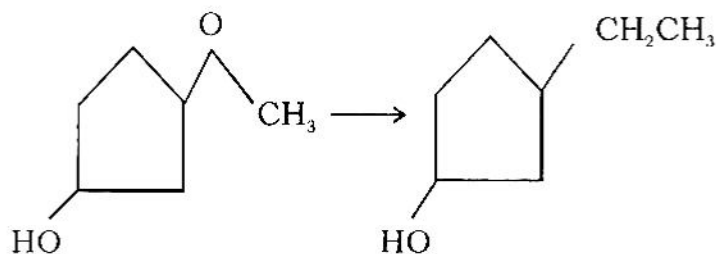
- 17.** Which of the following is true about a circular double-stranded DNA genome that is determined by chemical means to be 21% adenosine ?
- (1) The genome is 10.5% guanosine
 - (2) The genome is 21% guanosine
 - (3) The genome is 29% guanosine
 - (4) The genome is 58% guanosine
- 18.** Which of the 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 Ca^{2+} -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) N_2 , O_2
 - (3) O_2^{2-} , B_2
 - (4) O_2^+ , 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 $MgCl_2$ 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

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- 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 $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ is
(1) 1 (2) 2 (3) 3 (4) 4
- 29.** $(\text{NH}_4)_2\text{Cr}_2\text{O}_7$ on heating gives a gas which is also given by
(1) Heating NH_4NO_2
(2) Heating NH_4NO_3
(3) $\text{Mg}_3\text{N}_2 + \text{H}_2\text{O}$
(4) Na (comp.) + H_2O_2
- 30.** Anhydrous ferric chloride is prepared by
(1) Dissolving $\text{Fe}(\text{OH})_3$ in concentrated HCl
(2) Dissolving $\text{Fe}(\text{OH})_3$ in dilute HCl
(3) Passing dry HCl over heated iron scrap
(4) Passing dry Cl_2 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

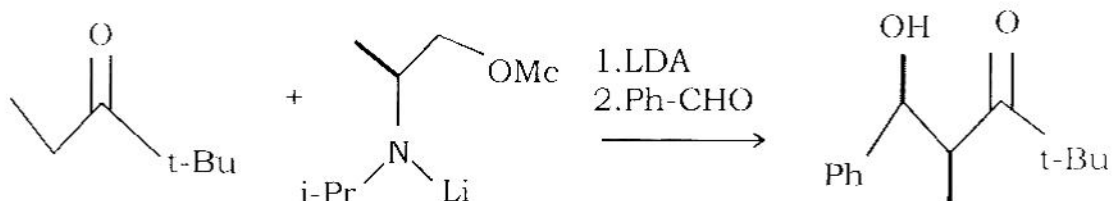


- (1) Zn(Hg), HCl
 - (2) NH₂NH₂, OH
 - (3) H₂, Ni
 - (4) NaBH₄
33. An oxygen containing organic compound upon oxidation forms a carboxylic acid as the only organic product with its molecular mass higher by 14 units. The organic compound is
- (1) a ketone
 - (2) an aldehyde
 - (3) a primary alcohol
 - (4) a secondary alcohol
34. An organic (X) compound having molecular formula C₈H₁₀ gives a dicarboxylic acid on reaction with alkaline KMnO₄ whereas after nitration X gives three mononitro derivatives. Compound X is
- (1) Ethyl benzene
 - (2) o-Xylene
 - (3) m-Xylene
 - (4) p-Xylene

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- 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, $A+B \rightarrow \text{Product}$, 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) $\text{Rate} = k [A] [B]$
 - (2) $\text{Rate} = k [A]^2 [B]$
 - (3) $\text{Rate} = k [A] [B]^2$
 - (4) $\text{Rate} = k [A]^2 [B]^2$
- 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



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

40. Conine is a/an

- (1) Pyrolidine alkaloid
- (2) Piperidine alkaloid
- (3) Pyrolizidine alkaloid
- (4) Isoquinoline alkaloid

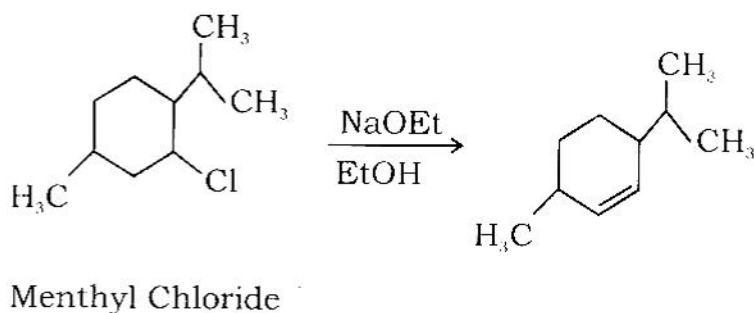
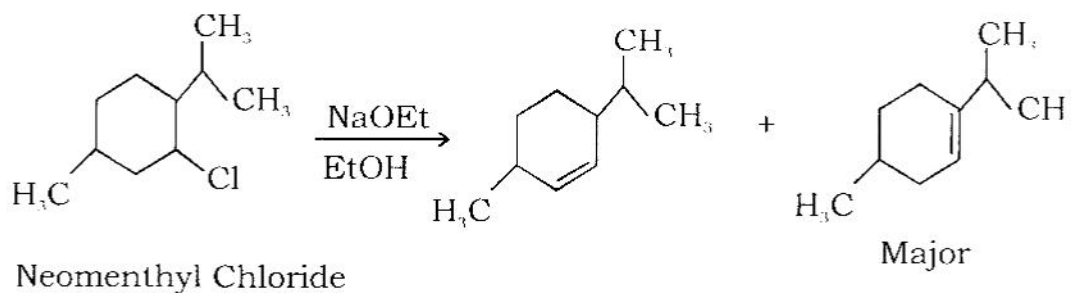
Short Answer Questions

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: δ 1.30 (triplet, 6H) δ 4.29 (quartet, 4H) δ 7.4-7.9 (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 1465 m 1450 m 1375 s 1300-1000.
2. A compound having molecular formula C₅H₁₂ has some isomers. All the isomers upon monochlorination give monochloro derivatives. How you will distinguish all the isomers of C₅H₁₂ and their monochloro derivatives with the help of PMR spectroscopy ?
3. Gamma isomer of benzene hexa chloride does not give any type of ionic elimination reaction. Explain why ?

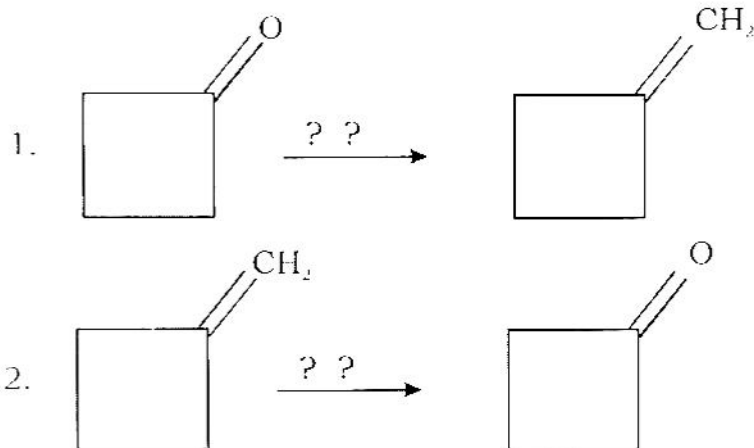
4. Menthyl chloride reacts with sodium ethoxide in ethanol to give a single elimination product whereas neomenthyl chloride reacts with sodium ethoxide in ethanol to give two elimination products with 200 time slower rate than menthyl chloride. Explain why ?



5. Ozonolysis (O_3 in CH_2Cl_2) of compound A under reducing conditions (zn/acetic acid) gives formaldehyde, 2-butanone, and compound B. Catalytic hydrogenation (H_2/Pd) of A gives 2,7-dimethylnonane. What is a possible structure for compound A ?

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6. Complete the following conversions in least steps:



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.

Question No.

Page for Short Answer

Question No.

Page for Short Answer

Question No.

Page for Short Answer

अभ्यर्थियों के लिए निर्देश

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

1. प्रश्न पुस्तिका मिलने के 10 मिनट के अन्दर ही देख लें कि प्रश्नपत्र में सभी पृष्ठ मौजूद हैं और कोई प्रश्न छूटा नहीं है। पुस्तिका दोषयुक्त पाये जाने पर इसकी सूचना तत्काल कक्ष-निरीक्षक को देकर सम्पूर्ण प्रश्नपत्र की दूसरी पुस्तिका प्राप्त कर लें।
2. परीक्षा भवन में लिफाफा 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 करें। दूसरा उत्तर-पत्र नहीं दिया जायेगा। केवल उत्तर-पत्र का ही मूल्यांकन किया जायेगा।
4. अपना अनुक्रमांक तथा उत्तर-पत्र का क्रमांक प्रथम आवरण-पृष्ठ पर पेन से निर्धारित स्थान पर लिखें।
5. उत्तर-पत्र के प्रथम पृष्ठ पर पेन से अपना अनुक्रमांक निर्धारित स्थान पर लिखें तथा नीचे दिये वृत्तों को गाढ़ा कर दें। जहाँ-जहाँ आवश्यक हो वहाँ प्रश्न-पुस्तिका का क्रमांक तथा सेट का नम्बर उचित स्थानों पर लिखें।
6. ओ० एम० आर० पत्र पर अनुक्रमांक संख्या, प्रश्नपुस्तिका संख्या व सेट संख्या (यदि कोई हो) तथा प्रश्नपुस्तिका पर अनुक्रमांक और ओ० एम० आर० पत्र संख्या की प्रविष्टियों में उपरिलेखन की अनुमति नहीं है।
7. उपर्युक्त प्रविष्टियों में कोई भी परिवर्तन कक्ष निरीक्षक द्वारा प्रमाणित होना चाहिये अन्यथा यह एक अनुचित साधन का प्रयोग माना जायेगा।
8. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार वैकल्पिक उत्तर दिये गये हैं। प्रत्येक प्रश्न के वैकल्पिक उत्तर के लिए आपको उत्तर-पत्र की सम्बन्धित पंक्ति के सामने दिये गये वृत्त को उत्तर-पत्र के प्रथम पृष्ठ पर दिये गये निर्देशों के अनुसार पेन से गाढ़ा करना है।
9. प्रत्येक प्रश्न के उत्तर के लिए केवल एक ही वृत्त को गाढ़ा करें। एक से अधिक वृत्तों को गाढ़ा करने पर अथवा एक वृत्त को अपूर्ण भरने पर वह उत्तर गलत माना जायेगा।
10. ध्यान दें कि एक बार स्याही द्वारा अंकित उत्तर बदला नहीं जा सकता है। यदि आप किसी प्रश्न का उत्तर नहीं देना चाहते हैं, तो संबंधित पंक्ति के सामने दिये गये सभी वृत्तों को खाली छोड़ दें। ऐसे प्रश्नों पर शून्य अंक दिये जायेंगे।
11. रफ कार्य के लिए प्रश्न-पुस्तिका के मुखपृष्ठ के अंदर वाला पृष्ठ तथा उत्तर-पुस्तिका के अंतिम पृष्ठ का प्रयोग करें।
12. परीक्षा के उपरान्त केवल ओ एम आर उत्तर-पत्र परीक्षा भवन में जमा कर दें।
13. परीक्षा समाप्त होने से पहले परीक्षा भवन से बाहर जाने की अनुमति नहीं होगी।
14. यदि कोई अभ्यर्थी परीक्षा में अनुचित साधनों का प्रयोग करता है, तो वह विश्वविद्यालय द्वारा निर्धारित दंड का/की, भागी होगा/होगी।