

BOOKLET NO.

063

**DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO**

**TBC : AKG-AP(PHARMACEUTICAL CHEM.)-17**

Time Allowed : 2 Hours

(Maximum Marks : 100)

**INSTRUCTIONS**

1. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET DOES NOT HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
2. You have to enter your Roll Number on the Test Booklet in the Box provided alongside. **DO NOT** write **anything** else on the Test Booklet.
3. This Test Booklet contains **100** items (questions). You will select the response which you want to mark on the Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose **ONLY ONE** response for each item.
4. You have to mark all your responses **ONLY** on the separate Answer Sheet provided. No erasing/correction fluid is allowed.
5. All items carry equal marks.
6. Before you proceed to mark in the Answer Sheet the response to various items in the Test Booklet, you have to fill in some particulars in the Answer Sheet as per instructions sent to you with your Admission Certificate.
7. After you have completed filling in all your responses on the Answer Sheet and the examination has concluded, you should hand over to the Invigilator **only the Answer Sheet**. You are permitted to take away with you the Test Booklet.
8. Sheets for rough work are appended in the Test Booklet at the end.
9. **Penalty for wrong answers :**  
**THERE WILL BE PENALTY (NEGATIVE MARKING) FOR WRONG ANSWERS MARKED BY A CANDIDATE IN THE OBJECTIVE TYPE QUESTION PAPERS.**
  - (i) There are four alternatives for the answers to every question. For each question for which a wrong answer has been given by the candidate, **one-fourth (0.25)** of the marks assigned to that question will be deducted as penalty.
  - (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answer happen to be correct and there will be same penalty as above for that question.
  - (iii) If a question is left blank i.e. no answer is given by the candidate, there will be **no penalty** for that question.
10. Use and carrying of Mobile Phone and Electronic Gadget is prohibited in the Examination Hall.

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1. Identify the biosynthetic pathway related to the biosynthesis of ricinoleic acid :
  - (A) Shikimic acid pathway
  - (B) Acetate Mevalonate pathway
  - (C) Conessine acetate pathway
  - (D) Acetate-Malonate pathway
2. The enzyme responsible for the conversion of 3-dehydroquinate to 3-dehydroshikimic acid is :
  - (A) 3-Dehydroshikimic acid synthase
  - (B) 3-Dehydroquinate reductase
  - (C) 3-Dehydroshikimic acid dehydratase
  - (D) 3-Dehydroquinate dehydratase
3. The ester of caffeic acid and (-) quinic acid is known as :
  - (A) Chlorogenic acid
  - (B) Abietic acid
  - (C) Coumaric acid
  - (D) Gibberellic acid
4. Identify the enzyme involved in the biosynthesis of anthocyanin :
  - (A) Dihydroflavonol 4-reductase
  - (B) Leucoanthocyanidin dioxygenase
  - (C) UDP-3-O-glucosyltransferase
  - (D) All of the above
5. In morphine biosynthesis, the enzyme, Salutaridine : NADPH 7-oxidoreductase is responsible for the conversion of salutaridine to :
  - (A) Salutaridinone
  - (B) Codeinone
  - (C) Salutaridinol
  - (D) None of the above
6. Identify the non-steroidal antifertility agents :
  - (A) Ethinyl estradiol
  - (B) Mestranol
  - (C) Diethylstilbesterol
  - (D) Quinestrol

7. Mifepristone, is the antifertility drug belongs to the category of ..... receptor antagonist.

- (A) Oestrogen
- (B) Androgen
- (C) Progesterone
- (D) None of the above

8. The conversion of Mevalonate to phosphomevalonic acid in Acetate-Mevalonate pathway is effected by the enzyme :

- (A) HMG CoA reductase
- (B) Phosphomevalonate kinase
- (C) Mevalonate-5-pyrophosphate decarboxylase
- (D) Mevalonate kinase

9. 'n' electrons in UV spectroscopy is :

- (A) The electrons present in saturated compounds
- (B) Non-bonded electrons
- (C) The electrons present in unsaturated compounds
- (D) All of the above

10. The source of antifungal drug Amphotericin B is :

- (A) *Penicillium glaucum*
- (B) *Streptomyces aureofaciens*
- (C) *Streptomyces griseus*
- (D) *Streptomyces nodosus*

11. Which antiviral agents are derivatives of natural nucleosides transformed in the base ?

- (A) Ribavirin
- (B) Acyclovir
- (C) Amantidine
- (D) Doxuridine

12. The anticancer drug carmustine is chemically :
- (A) 1, 3-Bis (2-chloroethyl)-1-nitrosourea
  - (B) 1, 3-Bis (2-chloromethyl)-1-nitrosourea
  - (C) 1, 2-Bis (2-chloroethyl)-1-nitrosourea
  - (D) 1, 2-Bis (2-chloromethyl)-1-nitrosourea
13. Identify the QSAR technique which is based on additivity principle :
- (A) Hansch analysis
  - (B) Free Wilson analysis
  - (C) Simplex method
  - (D) CoMFA analysis
14. Rate theory of receptor was given by :
- (A) Paton
  - (B) Gaddum
  - (C) Schild
  - (D) Arunlakshana
15. The following receptor has an intrinsic ion channel :
- (A) G-protein coupled receptor
  - (B) GABA-benzodiazepine receptor
  - (C) Opiate receptors
  - (D) Histaminergic receptor
16. All G protein-coupled receptors (GPCRs) contain 7 membrane-spanning regions with their :
- (A) C-terminus on the cytosolic face and N-terminus on the exoplasmic face
  - (B) N-terminus on the cytosolic face and C-terminus on the exoplasmic face
  - (C) C-terminus on the exoplasmic face and N-terminus on the cytosolic face
  - (D) N-terminus on the exoplasmic face and C-terminus on the cytosolic face

17. Select the receptor that is located intracellularly :

- (A) Opioid  $\mu$  receptor
- (B) Prostaglandin receptor
- (C) Steroid receptor
- (D) Angiotensin receptor

18. The xanthotoxin is chemically :

- (A) 7-Methoxy-9H-furo[3, 2-g] chromen 6-one
- (B) 9-Methoxy-7H-furo[3, 2-g] chromen 7-one
- (C) 9-Ethoxy-7H-furo[3, 2-g] chromen-7-one
- (D) 9-Ethoxy-7H-furo[3, 2-g] chromen 5-one

19. NMR spectrum can be recorded for the following nuclei *except* :

- (A)  $^{13}\text{C}$
- (B)  $^{19}\text{F}$
- (C)  $^2\text{H}$
- (D)  $^{35}\text{Cl}$

20. The following are the advantages of peptides as drug *except* :

- (A) High potency
- (B) High selectivity
- (C) Low accumulation in tissues
- (D) Rapid clearance

21. Identify the analgesic drug derived from marine source :

- (A) Ziconotide
- (B) Trabectedin
- (C) Eribulin Mesylate
- (D) Plitidepsin

22. In the most stable conformation of *trans* 1, 2-disubstituted cyclohexane, the position of substituent is :

- (A) 1 axial, 2 equatorial
- (B) 1 equatorial, 2 equatorial
- (C) 1 axial, 2 axial
- (D) 1 equatorial, 2 axial

23. According to Auwers Skita Rule, in a pair of *cis-trans* decalins, the ..... isomer has higher boiling point, density and refractive index.

- (A) *Cis*
- (B) *Trans*
- (C) Both (A) and (B)
- (D) None of the above

24. Order of stability of carbocation is :

- (A)  $1^\circ > 2^\circ > 3^\circ$
- (B)  $3^\circ > 2^\circ > 1^\circ$
- (C)  $1^\circ > 3^\circ > 2^\circ$
- (D)  $2^\circ > 3^\circ > 1^\circ$

25. The stability and reactivity of carbanion can be determined by :

- (A) Inductive effect
- (B) Hybridization
- (C) Extent of conjugation of anion
- (D) All of the above

26. The chemical name of alkylating agent chlorambucil is :

- (A) 4-[2-[Bis (4-chloroethyl) amino] phenyl] butanoic acid
- (B) 4-[4-[Bis (2-chloromethyl) amino] phenyl] butanoic acid
- (C) 4-[4-[Bis (2-chloroethyl) amino] phenyl] butanoic acid
- (D) 4-[4-[Bis (2-chloroethyl) amino] phenyl] propanoic acid

27. The following are Class III (potassium channel blocker) antiarrhythmic agents *except* :
- (A) Propafenone
  - (B) Timolol
  - (C) Ibutilide
  - (D) Sotalol
28. Identify the chemical name of antihyperlipidemic drug ezetimibe :
- (A) (3R, 4S)-1-(4-fluorophenyl)-3-[(3S)-3-(4-fluorophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl) azetidin-2-one
  - (B) (3S, 4R)-1-(4-fluorophenyl)-3-[(3R)-3-(4-fluorophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl) azetidin-2-one
  - (C) (3R, 4S)-1-(4-fluorophenyl)-3-[(3S)-2-(4-fluorophenyl)-3-hydroxypropyl]-3-(4-oxyphenyl) azetidin-2-one
  - (D) (3R, 4S)-1-(4-fluorophenyl)-2-[(3S)-3-(4-bromophenyl)-3-hydroxypropyl]-4-(4-hydroxyphenyl) azetidin-2-one
29. Anhydrotetracycline monooxygenase converts anhydrotetracycline to :
- (A) 12-Dihydrotetracycline
  - (B) 12-Dehydrotetracycline
  - (C) 12-Monooxytetracycline
  - (D) 12-Anhydrotetracycline
30. Identify the heterocyclic ring present in the structure of psoralen :
- (A) Furan
  - (B) Pyridine
  - (C) Pyrrole
  - (D) None of the above
31. Gibberellic acid is basically a :
- (A) Pentacyclic diterpene acid
  - (B) Pentacyclic monoterpene acid
  - (C) Tetracyclic monoterpene acid
  - (D) Tetracyclic diterpene acid

32. Identify the g value of the reference standard 1, 1-Diphenyl-2-picrylhydrazyl (DPPH) free radical used in ESR spectroscopy :

- (A) 1.4006
- (B) 5.0036
- (C) 2.0036
- (D) 4.0006

33. Compounds having high lipid solubility or high water solubility having long biological half-life and not susceptible to metabolism are known as :

- (A) Soft drugs
- (B) Hard drugs
- (C) Ante drugs
- (D) Prodrugs

34. The following are the diseases which are due to increase in nitric oxide levels *except* :

- (A) Atherosclerosis
- (B) Thrombosis
- (C) Alzheimer's disease
- (D) Huntington's disease

35. The amino acid count of neuronal nitric oxide synthase is :

- (A) 1153
- (B) 1203
- (C) 1433
- (D) 1304

36. Molsidnomine is the nitric oxide donor used in :

- (A) CVS disorder
- (B) ANS disorder
- (C) CNS disorder
- (D) All of the above



37. The following are the reactions catalyzed by nitrenes *except* :

- (A) Cycloaddition
- (B) C-H insertion
- (C) C-H elimination
- (D) Arylnitrene ring-expansion and ring-contraction

38. Negative charge on oxygen with adjacent C-C double bond is known as :

- (A) Enolate
- (B) Enamine
- (C) Enol
- (D) All of the above

39. 1, 5-Sigmatropic migration of hydrogen is symmetry allowed under ..... condition.

- (A) Photochemical
- (B) Thermal
- (C) Catalytic
- (D) Acidic

40. The following are concerted reactions *except* :

- (A) Cycloaddition
- (B) Electrocyclic reaction
- (C) Sigmatropic reaction
- (D) Perkin reaction

41. Friedel-Crafts reactions won't happen with ..... directors.

- (A) Ortho
- (B) Meta
- (C) Para
- (D) None of the above

42. Diazo coupling reaction is an example of ..... aromatic substitution.

- (A) Electrophilic
- (B) Nucleophilic
- (C) Pericyclic
- (D) All of the above

43. The following are the examples of nucleophilic aromatic substitution *except* :

- (A) Sandmeyer reaction
- (B) Gattermann reaction
- (C) Smiles rearrangement
- (D) Schmidt rearrangement

44. Carboxylic acids are synthesized by ..... of alcohols.

- (A) Reduction
- (B) Hydrolysis
- (C) Oxidation
- (D) None of the above

45. Identify the histamine receptor that cause bronchoconstriction ;

- (A) H<sub>4</sub>
- (B) H<sub>3</sub>
- (C) H<sub>2</sub>
- (D) H<sub>1</sub>

46. Dysfunction of dopaminergic neurotransmission in the way results in :

- (A) Parkinson's disease
- (B) Neuroleptic malignant syndrome
- (C) Tourette's syndrome
- (D) All of the above

47. Identify the adrenergic receptor responsible for platelet activation ;

- (A)  $\alpha$ -1
- (B)  $\alpha$ -2
- (C)  $\beta$ -1
- (D)  $\beta$ -2

48. Nicotinic acetylcholine receptors are also known as :

- (A) Ionotropic acetylcholine receptors
- (B) Prototropic acetylcholine receptors
- (C) Metabotropic acetylcholine receptors
- (D) None of the above

49. Hyoscyamine is ..... isomer of atropine.
- (A) Dextrorotatory
  - (B) Levorotatory
  - (C) Meso
  - (D) Diastereomer
50. Vindoline is precursor of :
- (A) Deacetoxyvindoline
  - (B) Tabersonine
  - (C) Vinblastin
  - (D) Conessine
51. The starting material for the biosynthesis of colchicine is :
- (A) (D)-Tabersonine
  - (B) (S)-Autumnaline
  - (C) (R)-Demethylcolcine
  - (D) (S)-Acetylcolchicine
52. Strictosidine, the biosynthetic precursor is formed by the combination of secologanin with :
- (A) Tryptamine
  - (B) Phenylalanine
  - (C) Strictosamine
  - (D) Isoleucine
53. Quinine contains two major fused-ring systems :
- (A) Quinoline and quinidine
  - (B) Quinoline and quinuclidine
  - (C) Quinine and quinuclidine
  - (D) None of the above

54. Abetic acid on dehydrogenation

yields :

- (A) Fluorenone
- (B) Dehydroabetoic acid
- (C) Dihydroabetic acid
- (D) Retene

55. Zingiberene on heating with

sulphur yields :

- (A) Cadalene
- (B) Rutilin
- (C) Xanthatoxin
- (D) Psoralen

56. Beta amyryn has ..... asymmetric centres.

- (A) 5
- (B) 6
- (C) 7
- (D) 8

57. Identify the principle of separation of paper chromatography :

- (A) Partition
- (B) Adsorption
- (C) Absorption
- (D) None of the above

58. Organic reaction in which an azide reacts with a carbonyl group to give an amine or amide, with expulsion of nitrogen :

- (A) Lossen rearrangement
- (B) Schmidt rearrangement
- (C) Favorskii rearrangement
- (D) Bayer-Villiger rearrangement

59. Identify the reaction which is an example of Carbocation 1, 2-rearrangement :

- (A) Favorskii rearrangement
- (B) Bayer-Villiger rearrangement
- (C) Wagner-Meerwein rearrangement
- (D) Benzidine rearrangement

60. Conversion of 1, 2-diols to carbonyl compound is known as :

- (A) Pinacol-pinacolone rearrangement
- (B) Lossen rearrangement
- (C) Cope rearrangement
- (D) None of the above

61. In Bayer-Villiger oxidation ..... is often added as a buffering agent to prevent transesterification.

- (A) Potassium hydroxide
- (B) Phosphoric acid
- (C) Disodium phosphate
- (D) None of the above

62. Identify the ideal reagent used for reductive amination :
- (A) Lithiumaluminiumhydride  
(B) Sodium Cyanoborohydride  
(C) Sodium Borohydride-Cerium (III) Chloride  
(D) Lithiumtrisamylborohydride
63. In organic chemistry, the kinetic product predominates when the reaction temperature is :
- (A) High  
(B) Low  
(C) Equal to atmospheric temperature  
(D) None of the above
64. Which of the following is *true* of any (S)-enantiomer ?
- (A) It is the mirror image of the corresponding (R)-enantiomer  
(B) It rotates plane-polarized light to the left  
(C) It rotates plane-polarized light to the right  
(D) It has the highest priority group on the left
65. (2R, 4S)-2, 4-Dibromopentane is a ..... compound.
- (A) Enantiomer  
(B) Dextro isomer  
(C) Meso  
(D) None of the above

66. The Wolff-Kishner reduction is a method for reductive deoxygenation of carbonyl groups under highly ..... condition.

- (A) Acidic
- (B) Basic
- (C) Neutral
- (D) Temperature

67. A reagent carrying out the function of a Synthone which cannot itself be used, often because it is too unstable is known as :

- (A) Synthone intermediate
- (B) Reactive intermediate
- (C) Synthetic equivalent
- (D) All of the above

68. A generalised fragment, usually an ion, produced by a disconnection is called as :

- (A) Synthetic equivalent
- (B) Reagent
- (C) Target molecule
- (D) Synthone

69. A linear peptide whose amino acid sequence is reversed and the  $\alpha$ -center chirality is inverted is known as :

- (A) Retro-inverso peptide
- (B) Dipeptide
- (C) Pseudopeptide
- (D) None of the above



70. Identify the CCR5 receptor

antagonist used as anti-HIV drug :

- (A) Maraviroc
- (B) Indinavir
- (C) Zidovudine
- (D) Raltegravir

71. (Z)-2-[4-(1, 2-diphenylbut-1-enyl)

phenoxy]-N, N-dimethyl-ethana-

mine is used in the treatment

of :

- (A) Malaria
- (B) Hypertension
- (C) Antiarrhythmic
- (D) Breast Cancer

72. Camptothecin acts by inhibiting :

- (A) Topoisomerase I
- (B) HGPRTase
- (C) DNA dependent RNA polymerase
- (D) Thymidylate synthase

73. The elution process in which gradual

increase in polarity of mobile phase

used for separation of samples in

HPLC is known as :

- (A) Isocratic elution
- (B) Isometric elution
- (C) Gravimetric elution
- (D) Gradient elution

74. The atropisomerism occurs in :

- (A) Biphenyl compounds
- (B) Allenes
- (C) Spirans
- (D) Decalins

75. The normal tetrahedral angle is :

- (A)  $106.82^\circ$
- (B)  $109.28^\circ$
- (C)  $104.67^\circ$
- (D)  $90.47^\circ$

76. The energy required for conversion of chair form to boat form is ..... kcal.

- (A) 15
- (B) 21
- (C) 18
- (D) 11

77. In Diels-Alder reaction with respect to the dienophile the addition is stereoselectively :

- (A) Anti addition
- (B) Thermal addition
- (C) Syn addition
- (D) Photochemical addition

78. Identify the organic reaction involving the [3, 3]-Sigmatropic rearrangement :

- (A) Cope rearrangement
- (B) Curtius rearrangement
- (C) Lossen rearrangement
- (D) Beckmann rearrangement

79. The reaction of hydrazobenzene with acids in Benzidine rearrangement yields :

- (A) 2, 2'-diaminobiphenyl
- (B) 4, 4'-dinitrobiphenyl
- (C) 3, 3'-diaminobiphenyl
- (D) 4, 4'-diaminobiphenyl

80. The Curtius rearrangement is a chemical reaction that involves the rearrangement of an acyl azide to :

- (A) Azidine
- (B) Isocyanate
- (C) Acyl halide
- (D) Alkene

81. Which of the following constitute the Indian Parliament ?

- (A) Lok Sabha, Rajya Sabha and P.M.
- (B) Lok Sabha, Rajya Sabha and Parliament House
- (C) Lok Sabha, Rajya Sabha and President
- (D) Lok Sabha, Rajya Sabha and Parliamentary Minister

82. NREGA was renamed "MNREGA" on :

- (A) 2nd October, 2009
- (B) 2nd October, 2006
- (C) 2nd October, 2011
- (D) 2nd October, 2010

83. Who gave the name 'First War of Independence' to 1857 Mutiny ?

- (A) Dadabhai Naoroji
- (B) V.D. Savarkar
- (C) Gopal Krishna Gokhale
- (D) Pandit J.L. Nehru

84. Which vitamin is required for in clothing of blood ?

- (A) Vitamin K
- (B) Vitamin A
- (C) Vitamin C
- (D) Vitamin E

85. Gandhiji first experimented with the principle of Satyagraha at :

- (A) Champaran
- (B) Khera
- (C) Bardoli
- (D) Dandi

86. Biodiversity day is celebrated on :

- (A) 28th February
- (B) 1st June
- (C) 3rd November
- (D) 29th December

87. By whom the Jurisdiction of Supreme Court of India can be enlarged ?

- (A) President of India
- (B) Parliament by passing a resolution
- (C) Parliament by making a law
- (D) President in consultation with Chief Justice of India

88. How many recognised languages are there in India ?

- (A) 17
- (B) 18
- (C) 19
- (D) 22

89. The largest continent of the world is :

- (A) North America
- (B) Africa
- (C) Europe
- (D) Asia

90. The most popular festival in Tamil Nadu is :

- (A) Onam
- (B) Gudipadwa
- (C) Swang
- (D) Pongal

91. Which Kangra ruler imprisoned the minor ruler of Mandi (Ishwari Sen) at Sujampur Tira for 12 years ?

- (A) Hamir Chand
- (B) Hari Chand
- (C) Sansar Chand
- (D) Ghamand Chand

92. Katasan Devi temple is in district :

- (A) Solan
- (B) Shimla
- (C) Sirmour
- (D) Kullu

93. "PEPSU" stands for :

- (A) Patiala and East Punjab States Union
- (B) Punjab and Patiala States Union
- (C) Phagwara and East Patiala States Union
- (D) None of the above

94. How many districts in Himachal Pradesh send 5 MLAs each to Himachal Legislative Assembly ?

- (A) 3
- (B) 4
- (C) 5
- (D) 6

95. Dr. Yashwant Singh Parmar was born on :

- (A) 4th August, 1906
- (B) 16th January, 1917
- (C) 12th June, 1901
- (D) 2nd February, 1920

96. Which is the principal tributary of Sutlej river in Kinnaur district ?

- (A) Nogli
- (B) Baspa
- (C) Chaba
- (D) Andhra

97. Bilaspur remained Part 'C' state upto :

- (A) June, 1954
- (B) June, 1956
- (C) July, 1957
- (D) 1 Nov., 1966

98. What was the Vedic name of Sutlej river ?

- (A) Kadambri
- (B) Bipasha
- (C) Shaturdu
- (D) Salli

99. Who called Baba Kanshi Ram

"Pahari Bulbul" ?

- (A) Bhakshi Partap Singh
- (B) Sarojini Naidu
- (C) Sardar Patel
- (D) Dr. Y.S. Parmar

100. Who was the first Lok Ayukta of Himachal Pradesh ?

- (A) T.V.R. Tatachari
- (B) H.S. Thakur
- (C) R.S. Pathak
- (D) R.C. Malhotra