

# 107/2018

Question Booklet  
Alpha Code

A

Question Booklet  
Serial Number

101169

Total No. of Questions: 100

Maximum : 100 Marks

Time : 75 Minutes

## INSTRUCTIONS TO CANDIDATES

1. The question paper will be given in the form of a Question Booklet. There will be four versions of question booklets with question booklet alpha code viz. A, B, C & D.
2. The Question Booklet Alpha Code will be printed on the top left margin of the facing sheet of the question booklet.
3. The Question Booklet Alpha Code allotted to you will be noted in your seating position in the Examination Hall.
4. If you get a question booklet where the alpha code does not match to the allotted alpha code in the seating position, please draw the attention of the Invigilator IMMEDIATELY.
5. The Question Booklet Serial Number is printed on the top right margin of the facing sheet. If your question booklet is un-numbered, please get it replaced by new question booklet with same alpha code.
6. The question booklet will be sealed at the middle of the right margin. Candidate should not open the question booklet, until the indication is given to start answering.
7. Immediately after the commencement of the examination, the candidate should check that the question booklet supplied to him contains all the 100 questions in serial order. The question booklet does not have unprinted or torn or missing pages and if so he/she should bring it to the notice of the Invigilator and get it replaced by a complete booklet with same alpha code. This is most important.
8. A blank sheet of paper is attached to the question booklet. This may be used for rough work.
9. **Please read carefully all the instructions on the reverse of the Answer Sheet before marking your answers.**
10. Each question is provided with four choices (A), (B), (C) and (D) having one correct answer. Choose the correct answer and darken the bubble corresponding to the question number using Blue or Black Ball-Point Pen in the OMR Answer Sheet.
11. **Each correct answer carries 1 mark and for each wrong answer 1/3 mark will be deducted. No negative mark for unattended questions.**
12. No candidate will be allowed to leave the examination hall till the end of the session and without handing over his/her Answer Sheet to the Invigilator. Candidates should ensure that the Invigilator has verified all the entries in the Register Number Coding Sheet and that the Invigilator has affixed his/her signature in the space provided.
13. Strict compliance of instructions is essential. Any malpractice or attempt to commit any kind of malpractice in the Examination will result in the disqualification of the candidate.

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Maximum : 100 Marks

Time : 1 hour and 15 minutes

1. Who wrote the book '*Jeevithapada*' ?  
(A) K.K. Pillai (B) N. Krishna Pillai  
(C) Cherukad Govinda Pisharadi (D) C. Kesavan
2. Which among the social reformer had conducted the '*Thuvayal Pathy*' ?  
(A) Vaikunda Swamikal (B) Thycaud Aiya  
(C) Chattambi Swamikal (D) Ayyankali
3. Which fort was known as 'Matcotai' ?  
(A) Palakkad Fort (B) Bekkal Fort  
(C) St. Angelo Fort (D) Udayagiri Fort
4. Who was known as 'Urupillai' ?  
(A) Ayyankali (B) Vagbhadananadan  
(C) C.V. Kunjuraman (D) Mannath Padmanabhan
5. Who wrote the poem '*Jathinirnayam*' in 1914 ?  
(A) Changapuzha Krishna Pillai (B) Kumaranasan  
(C) Chattambi Swamikal (D) Sree Narayan Guru
6. Who started the Malayalam newspaper '*Kesari*' ?  
(A) Chengulathu Kunjiraman Menon  
(B) Bal Gangadhar Tilak  
(C) A. Balakrishna Pillai  
(D) E.M.S. Namboodirippad
7. The famous freedom fighter Moulana Abul Kalam Azad was born at  
(A) Mecca (B) Morocco  
(C) Lahore (D) Midnapore
8. Who wrote the first Bengali drama, "*Kulin Kulasarvarna*" ?  
(A) Damodar Dutta Banerjee (B) Bankim Chandra Chatterjee  
(C) Pandit Ramanarayan (D) Asuthosh Mukharjee
9. Who said Gopala Krishna Gokhale as "the practical, strenuous worker and the mystic dreamer of dreams" ?  
(A) Dr. B.R. Ambedkar (B) Sarojini Naidu  
(C) Jawaharlal Nehru (D) Dr. Rajendra Prasad

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10. Which nationalist was known as 'the Uncrowned King of India' ?  
 (A) Bal Gangadhar Tilak (B) Lala Lajpat Rai  
 (C) Aurobindo Ghosh (D) Bipin Chandra Pal
11. "It can already be forecast with some confidence that Gandhiji's effect on human history is going to be greater and more lasting than Stalin of Russia and Adolf Hitler of Germany." Who said ?  
 (A) Albert Einstein (B) Sir Stafford Cripps  
 (C) Arnold Toynbee (D) Bernard Shaw
12. The Commonwealth Games - 2018 was held at  
 (A) Glasgow (B) Gold Coast  
 (C) Brunei (D) Sydney
13. Which South Indian State unveiled the proposed official state flag ?  
 (A) Telangana (B) Tamil Nadu  
 (C) Karnataka (D) Kerala
14. Win Mynt became the new president of  
 (A) Vietnam (B) Laos  
 (C) The Philippines (D) Myanmar
15. Who said 'Books thinks for me' ?  
 (A) Alexander Pushkin (B) Leo Tolstoy  
 (C) Charles Dickens (D) Charles Lamb
16. Where is *Oduchuttapaduka Vanya Jathika* marshy land situated ?  
 (A) Mangalavanam (B) Ramakalmedu  
 (C) Palode (D) Madayi
17. Which is the oldest surviving Newspaper in Malayalam ?  
 (A) Malayala Manorama (B) Nazrani Deepika  
 (C) Mathrubhumi (D) Kerala Koumudi
18. Who wrote the book 'Andaman Diary' ?  
 (A) E.M.S. Namboodiripad (B) C. Achutha Menon  
 (C) A.K. Antony (D) E.K. Nayanar
19. What was the real name of Jhansi Rani Lakshmi Bai ?  
 (A) Manikarnika (B) Devapriya  
 (C) Kanakambha (D) Devayani
20. *Ozhuku* records in Kerala history means  
 (A) Temple Records (B) Land Records  
 (C) Military Records (D) English Records

21. Which of the following molecule belongs to  $C_{2v}$  point group ?  
(A)  $SO_2Cl_2$  (B)  $CHCl_3$   
(C)  $N_2O_4$  (D)  $B_2H_6$
22. The number of microstates (quantum states) possible for carbon is  
(A) 24 (B) 20  
(C) 15 (D) 12
23. Which of the following types of spectroscopy is a light scattering technique ?  
(A) Electron paramagnetic resonance spectroscopy  
(B) Infrared spectroscopy  
(C) Raman spectroscopy  
(D) Ultraviolet-visible spectroscopy
24. Which of the following type of electromagnetic radiations are used in ESR spectroscopy ?  
(A) Infrared radiation (B) Microwave radiation  
(C) Radio frequency waves (D) X-rays
25. Which of the following vibrational mode of carbon dioxide is IR active ?  
I. Symmetric stretching  
II. Asymmetric stretching  
III. Bending  
(A) I only (B) III only  
(C) I and III only (D) II and III only
26. The kinetic energy of an electron is 11.4 eV. Its de Broglie wavelength is nearly  
(A) 600 pm (B) 720 pm  
(C) 485 pm (D) 364 pm
27. Which of the following represent general formula of boron hydrides having arachno structure ?  
(A)  $B_nH_{n+4}$  (B)  $B_nH_{n+6}$   
(C)  $B_nH_{n+10}$  (D)  $[B_nH_n]^{2-}$
28. Bond order between Mo atoms in the complex  $[Mo_2(CH_3COO)_4]$  is  
(A) 1 (B) 2  
(C) 3 (D) 4

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29. Which of the following pair of molecules belongs to the same point group ?  
 (A)  $\text{H}_2\text{S}$  and  $\text{SO}_2$  (B)  $\text{BCl}_3$  and  $\text{PCl}_5$   
 (C)  $\text{PCl}_3$  and  $\text{ICl}_3$  (D)  $\text{CO}_2$  and  $\text{SO}_2$
30. Indian Institute of Chemical Technology (IICT) is located at  
 (A) Hyderabad (B) New Delhi  
 (C) Lucknow (D) Pune
31. Which of the following molecular orbital have two nodal planes ?  
 (A)  $\sigma 2p_z$  (B)  $\pi 2p_x$   
 (C)  $\pi^* 2p_y$  (D)  $\sigma^* 2p_z$
32. The eigen functions of the Hamiltonian  $H$  ( $H = T + V$ ) of a harmonic oscillator are (where  $T$  and  $V$  are kinetic energy and potential energy operators, respectively)  
 (A) Eigen functions of neither  $T$  nor  $V$   
 (B) Eigen functions of  $V$  but not of  $T$   
 (C) Eigen functions of  $T$  but not of  $V$   
 (D) Eigen functions of  $T$  as well as  $V$
33. Which of the following nuclei do not show nuclear magnetic resonance ?  
 (A)  $^{19}\text{F}$  (B)  $^{13}\text{C}$   
 (C)  $^{14}\text{N}$  (D)  $^{16}\text{O}$
34. The  $d$  orbital involved in the  $sp^3d$  hybridisation is  
 (A)  $d_{x^2-y^2}$  (B)  $d_{xy}$   
 (C)  $d_z^2$  (D)  $d_{yz}$
35. On the basis of VSEPR theory, the shape of  $\text{SF}_4$  and  $\text{XeF}_4$  are respectively  
 (A) See saw and tetrahedral (B) See saw and square planar  
 (C) Tetrahedral and square pyramid (D) Tetrahedral and T shape
36. Transport of ions from one solution through ion-exchange membranes to another solution under the influence of an applied electric field is called  
 (A) Electrophoresis (B) Electrodialysis  
 (C) Reverse osmosis (D) Brownian motion

37. In which of the following compounds, C – O stretching frequency is lowest ?  
(A) Acetophenone (B) Methyl acetate  
(C) Acetic acid (D) Acetone
38. Which of the following does not exist as per MO theory ?  
(A)  $\text{Be}_2^{2+}$  (B)  $\text{O}_2^{2+}$   
(C)  $\text{N}_2^{2+}$  (D)  $\text{B}_2^{2+}$
39. The increase in the conductivity of an electrolyte solution when the applied voltage has a very high frequency is known as  
(A) Wien effect (B) Super conductivity  
(C) Debye-Falkenhagen effect (D) Curie effect
40. The BET (Brunauer-Emmett-Teller) equation is used to study  
(A) Surface area of solids (B) Specific conductivity of solids  
(C) Protective action of colloids (D) Light scattering properties of colloids
41. How many lattice points are required to represent a unit cell of NaCl ?  
(A) 13 (B) 8  
(C) 16 (D) 27
42. Pd/Cu-catalyzed cross-coupling of organohalides with terminal alkynes is known as  
(A) Stille coupling (B) Sonogashira coupling  
(C) Suzuki coupling (D) Kumada cross-coupling
43. Which of the following is involved in Peterson olefination reaction ?  
(A)  $\beta$ -Silanol (B) Phosphorous ylide  
(C) Sulphur ylide (D) Nitrene
44. The conversion of silver carboxylate to alkyl or aryl bromide by treatment with bromine is called  
(A) Kolbe-Schmitt reaction (B) Prins reaction  
(C) Hunsdiecker-Borodine reaction (D) Houben-Hoesch reaction
45. Number of radial nodes for a 5d orbital is  
(A) 2 (B) 3  
(C) 1 (D) 5



46. Glucose on reduction with sodium borohydride in aqueous medium gives  
(A) An enantiomeric mixture (B) A diastereomeric mixture  
(C) A single enantiomer (D) A mixture of regioisomers
47. Which of the following is an alkaloid ?  
(A) Reserpine (B) Quercetin  
(C) Isoborneol (D) Tryptophan
48. How many aldols are obtained when a mixture of acetaldehyde and propionaldehyde is treated with cold and dilute sodium hydroxide solution ?  
(A) 3 (B) 2  
(C) 7 (D) 4
49. Mond's process is used in the refining of  
(A) Copper (B) Nickel  
(C) Silver (D) Aluminium
50. Which of the following reaction can be carried out with sodium borohydride ?  
(A) Reduction of acetic acid into ethanol  
(B) Reduction of propanone into isopropyl alcohol  
(C) Reduction of acetamide into ethyl amine  
(D) All the above
51. The crystal defect found in yellow form of zinc oxide obtained by heating white zinc oxide crystals in an open vessel can be described as  
(A) Schottky defect (B) Frenkel defect  
(C) Metal excess defect (D) Metal deficiency defect
52. The acid containing an alcoholic functional group in its structure is  
(A) Malonic acid (B) Crotonic acid  
(C) Citric acid (D) Pyruvic acid
53. The detection of ions present in a solution on the basis of electric current or a change in electric current is called as  
(A) Argentometry (B) Potentiometry  
(C) Voltametry (D) Amperometry

54. The elements Europium and Gadolinium are members of  
 (A) Lanthanide series (B) 5d transition series  
 (C) Actinide series (D) 4d transition series
55. Sodium lauryl sulphate finds application as  
 (A) Industrial solvent (B) Anaesthetic agent  
 (C) Insecticide (D) Synthetic detergent
56. Which of the following complex does not obey the 18 electron rule ?  
 (A) Potassium ferrocyanide (B) Potassium ferricyanide  
 (C) Nickel tetracarbonyl (D) Ferrocene
57. In the Monsanto acetic acid process, acetic acid is manufactured from  
 (A) Methane (B) Methanol  
 (C) Ethylene (D) Acetylene
58. Which of the following amino acid is responsible for the Hopkins-Cole test for proteins ?  
 (A) Tryptophan (B) Tyrosine  
 (C) Cysteine (D) Aspartic acid
59. If an aqueous solution of potassium dichromate is made alkaline by adding sufficient amount of dilute sodium hydroxide solution, the colour of resulting solution will be  
 (A) Orange (B) Green  
 (C) Yellow (D) Blue
60. The highest oxidation state exhibited by elements belonging to lanthanide series is  
 (A) +3 (B) +8  
 (C) +7 (D) +4
61. Which of the following divalent metal ion have lowest enthalpy of hydration represented in the following equation ?  

$$M^{2+}_{(g)} + 6H_2O_{(l)} \longrightarrow [M(O_2H)_6]^{2+}_{(aq)}$$
 (A)  $Ti^{+2}$  (B)  $Mn^{+2}$   
 (C)  $Fe^{+2}$  (D)  $Ni^{+2}$



62. A decrease in the Racah interelectronic repulsion parameter, represented by the symbol  $B$  that occurs when a transition-metal free ion forms a complex with ligands is called
- (A) Nephelauxetic effect                      (B) Trans effect  
(C) Jahn Teller distortion                      (D) Crystal field splitting
63. Which of the following is the monomer of natural rubber ?
- (A) 2-Chloro-1, 3-butadiene                      (B) 1, 3-Butadiene  
(C) 2-Methyl-1, 3-butadiene                      (D) Styrene
64. A relation used in polarography
- (A) BET equation                      (B) Nernst equation  
(C) Debye-Huckel-Onsager equation                      (D) Ilkovic equation
65. Rutile is a mineral of
- (A) Zirconium                      (B) Titanium  
(C) Manganese                      (D) Uranium
66. Which of the following analytical methods does not use an electron beam ?
- (A) SEM                      (B) TEM  
(C) STEM                      (D) STM
67. Which of the following is a pi-acid ?
- (A) CO                      (B) HC/  
(C) NH<sub>3</sub>                      (D) BC<sub>3</sub>
68. The magnetic moment of an ion was found to be 4.9 B.M. The ion may be
- (A) Co(II)                      (B) Fe(III)  
(C) Fe(II)                      (D) Ni(II)
69. Different spatial arrangement of atoms or group of atoms in a molecule that are interconvertible by rotation about a single bond are called
- (A) Conformational isomers                      (B) Configurational isomers  
(C) Geometrical isomers                      (D) Enantiomers

70. A compound gives a mass spectrum with peaks at  $m/z = 77$  (40%), 112 (100%), 114 (33%) and essentially no other peaks. Identify the compound.
- (A) Chlorobenzene (B) Bromobenzene  
(C) Benzaldehyde (D) Acetophenone
71. The lowest energy term for the  $d^6$  configuration is
- (A)  $^2D$  (B)  $^1P$   
(C)  $^1D$  (D)  $^5D$
72. The mass spectrum of a halogen compound exhibited molecular ion peaks at  $m/z$  corresponding to  $M^+$ ,  $(M + 2)^+$ ,  $(M + 4)^+$  and  $(M + 6)^+$  in the ratio 1 : 3 : 3 : 1. The compound may likely to contain
- (A) 2 Br atoms (B) 3 Cl atoms  
(C) 3 Br atoms (D) 2 Cl atoms
73. Cumene hydroperoxide process is used in the manufacture of
- (A) Nitrobenzene (B) Phenol  
(C) Chlorobenzene (D) Aniline
74. Benzene is nitrated with nitrating mixture and then chlorinated using  $Cl_2/FeCl_3$  in the absence of light. The product obtained was then treated with tin and  $HCl$ . The final product in the above reaction sequence is
- (A) m-Dinitrobenzene (B) m-Nitroaniline  
(C) m-Chloroaniline (D) m-Chlorophenyl hydrazine
75. Which of the following compound is most basic ?
- (A) Pyrrole (B) Pyridine  
(C) Piperidine (D) Morpholine
76. In which of the following reactions a carboxylic acid is NOT obtained ?
- (A) Hydrolysis of a nitrile in acid medium.  
(B) Hydrolysis of the addition product obtained from a Grignard reagent and  $CO_2$ .  
(C) Oxidation of primary alcohol with acid  $KMnO_4$ .  
(D) Heating acid amide with  $Br_2$  and  $NaOH$ .
77. Benzene diazonium chloride can be converted into benzene by heating with
- (A) Water (B) Ethanol  
(C) Sodium nitrite (D) Benzene and  $NaOH$



78. Picryl chloride can be converted into picric acid by treating with boiling water. The intermediate involved in the above reaction is
- (A) Carbocation (B) Carbanion  
(C) Free radical (D) Benzyne
79. The number of 3c-2e bonds present in  $\text{Al}(\text{BH}_4)_3$  is
- (A) 0 (B) 3  
(C) 6 (D) 4
80. Which of the following reagent is most suitable for coupling an amine with a carboxylic acid ?
- (A) DCC (B) DDQ  
(C) LDA (D) HMPA
81. The oxidation number of Cr in  $\text{CrO}_5$  is
- (A) +5 (B) +10  
(C) +6 (D) +4
82. Which of the following molecule can undergo both oxidation and reduction ?
- (A)  $\text{H}_2\text{SO}_4$  (B)  $\text{HNO}_3$   
(C)  $\text{SO}_3$  (D)  $\text{SO}_2$
83. Which of the following molecule can show geometrical isomerism ?
- (A) 1,2-dimethylcyclohexane (B) 2-methyl-2-pentene  
(C) 3-methyl-1-butene (D) 3-ethyl-3-hexene
84. Which of the following is a linear polymer of  $\beta$ -D-glucose ?
- (A) Amylose (B) Cellulose  
(C) Glycogen (D) Amylopectin
85. Alkyl or aryl boronic acids and its esters are used in
- (A) Suzuki coupling (B) Negishi coupling  
(C) Julia-Kocienski olefination (D) Hiyama coupling
86. If the cluster valence electron count in a metal cluster is 60, then the structure of metal framework will be
- (A) Square (B) Butterfly  
(C) Tetrahedron (D) Square pyramid

87. Cyclohexene can be converted into 3-chlorocyclohexene by using  
(A)  $\text{PBr}_3$  (B) Solution of  $\text{Br}_2$  in  $\text{CCl}_4$   
(C)  $\text{HBr}$  (D) NBS in presence of light
88. The iodide induced dehalogenation of meso-2, 3-dibromobutane gives  
(A) Cis-2-butene (B) Trans-2-butene  
(C) 1, 3-Butadiene (D) 1-Butene
89. Which of the following most readily undergoes electrophilic substitution reactions ?  
(A) Benzene (B) Acetophenone  
(C) Anisole (D) Nitrobenzene
90. Which of the following alloy contains copper, tin and zinc ?  
(A) Bronze (B) Brass  
(C) Solder (D) Gun metal
91. Which functional group can be protected by using Dihydropyran (3, 4-Dihydro-2H-pyran) in organic synthesis ?  
(A) Alcoholic OH (B) Aldehyde  
(C) Nitro (D) Keto
92. o-Sulphobenzimide is used as  
(A) Antifungal drug (B) Sweetening agent  
(C) Surfactant (D) Plasticizer
93. Professor of Chemistry who is known as "Plastic Man of India" and who received the civilian award Padma Shri in 2018 is  
(A) Rajagopalan Vasudevan (B) E.D. Jemmis  
(C) G.N. Ramachandran (D) N. Krishnamurthy
94. Which of the following can give positive Tollens test ?  
(A) Acetone (B) Formic acid  
(C) Isobutyl alcohol (D) Acetic acid



95. Match List – I with List – II using the codes given below :

**List – I**

1. Conversion of cyclohexane-1, 2-dione to 1-hydroxycyclopentane-1-carboxylic acid
2. Conversion of 2-chlorocycloheptanone to cyclohexane carboxylic acid
3. Conversion of benzophenone oxime to benzanilide
4. Conversion of phenyl acetate into a mixture of o-hydroxyacetophenone and p-hydroxyacetophenone

**List – II**

- P. Fries rearrangement
- Q. Favorskii rearrangement
- R. Benzil-benzilic acid rearrangement
- S. Beckmann rearrangement

- |     | 1 | 2 | 3 | 4 |
|-----|---|---|---|---|
| (A) | R | S | P | Q |
| (B) | S | R | P | Q |
| (C) | R | Q | S | P |
| (D) | S | Q | P | R |

96. Conversion of a secondary alcohol into corresponding ketone by using DMSO and oxalyl chloride followed by treating with a base like triethyl amine is called

- (A) Swern oxidation
- (B) Oppenauer oxidation
- (C) Jones oxidation
- (D) Corey-Kim oxidation

97. Which of the following have lowest pKa ?

- (A) 2-Fluoroethanoic acid
- (B) 2-Cyanoethanoic acid
- (C) 2-Chloroethanoic acid
- (D) 2-Nitroethanoic acid

98. Sanger's reagent is

- (A) Phenyl isocyanate
- (B) 2, 4-Dinitrofluorobenzene
- (C) 2, 4-Dinitrophenyl hydrazine
- (D) Dimethyl zinc (II)

99. Alkylidene triphenyl phosphoranes are called

- (A) Edman's reagent
- (B) Gilman's reagent
- (C) Wittig reagent
- (D) Frankland's reagent

100. Addition of enolate ion to a conjugated carbonyl compound is called

- (A) Tischenko's reaction
- (B) Diels-Alder reaction
- (C) Cannizaro's reaction
- (D) Michael addition