

019/2018

Question Booklet  
Alpha Code

A

Question Booklet  
Serial Number

Total Number of Questions : 100

Time : 75 Minutes

Maximum Marks : 100

### 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.



019/2018

1. The largest inland salt water lake in India, namely Sambhar Lake is located in \_\_\_\_\_.  
(A) Orissa (B) Bihar (C) West Bengal (D) Rajasthan
2. Of the following rivers which is the tributary of Narmada ?  
(A) Musi (B) Indravati (C) Hiran (D) Kapila
3. Gomal and Bolan Passes run through the \_\_\_\_\_.  
(A) Himalayas (B) Western Ghats  
(C) Aravalli Hills (D) Vindhya-Satpura ranges
4. Which historian made the following argument while analyzing the character of the Revolt of 1857 ?  
"The revolt of 1857 cannot be regarded as national in the full modern sense of the word. Though the sentiment was anti-foreign, there was no positive national content in it."  
(A) Susobhan Sarkar (B) A.R. Desai  
(C) S.B. Chaudhuri (D) P.C. Joshi
5. The 'Quit India' resolution was passed by the Bombay session of the AICC on \_\_\_\_\_.  
(A) 9<sup>th</sup> August 1942 (B) 8<sup>th</sup> August 1942  
(C) 6<sup>th</sup> August 1942 (D) 7<sup>th</sup> August 1942
6. Who formed a *Samiti* namely Swadesh Bandhab Samiti in Barisal to spread swadeshi messages among the masses after the partition of Bengal in 1905 ?  
(A) Bipin Chandra Pal (B) Mukunda Das  
(C) Ashwin Kumar Dutt (D) Lala Lajpat Rai
7. Who among the following freedom fighter was NOT associated with the Ghadar movement ?  
(A) Lala Hardayal (B) Ram Chandra (C) Barkathullah (D) B.K. Dutt
8. Who played a leading role in drafting the Five Year Plan of 1956-61 ?  
(A) Prof. P.C. Mahalanobis (B) Prof. K.N. Raj  
(C) V.K.R.V. Rao (D) Raj Chandra Bose

A

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{P.T.O.}

9. Porkalam, Cheramangad and Pazhayannur are the major \_\_\_\_\_ sites excavated in Kerala.  
 (A) Megaliths (B) Mesolithic (C) Neolithic (D) Palaeolithic
10. Which Pass in the Western Ghat connects Madurai district in Tamilnadu with the High Ranges in Idukki district ?  
 (A) Aruvaimozhi Pass (B) Perambadi Pass  
 (C) Bodinayakannur Pass (D) Periya Pass
11. Among the following works which one is written by Brahmananda Sivayogi ?  
 (A) Pracheena Malayalam (B) Mokshapradeepam  
 (C) Jathikkummy (D) Vedadhikara Niroopanam
12. Name the social reformer and poet of Kerala who received the titles namely *Sahityanipunan* and *Kavitilakan* from Valiya Tampuran of Cochin.  
 (A) Kumaranasan (B) Vengayil Kunhiraman Nair  
 (C) Thycaud Ayya (D) Pandit Karuppan
13. The "Yachana Yatra" in 1931 from Thrissur to Kasargod on foot, was conducted under the leader ship of which social reformer of Kerala.  
 (A) Kumara Guru (B) Ayyankali  
 (C) V.T. Bhattathiripad (D) Dr. Palpu
14. P. Bhargavi Amma, M. Lakshmikutty Amma and K. Devayani were the important leaders of the women division of \_\_\_\_\_.  
 (A) Atma Vidya Sangham (B) Yogakshema Sabha  
 (C) Prathyaksha Raksha Daiva Sabha (D) Valamaha Sabha
15. Match the following with the help of the CODES given below :
- |                       |                                     |
|-----------------------|-------------------------------------|
| (a) Poikayil Yohannan | (i) Samatwa Samajam                 |
| (b) Pandit Karuppan   | (ii) Uralunkal AikyaNanaya Sangham  |
| (c) Vagbhatananda     | (iii) Prathyksha Raksha Daiva Sabha |
| (d) Ayya Vaikundar    | (iv) Cochin Pulaya Maha Sabha       |
- Codes :**
- |           |       |       |       |
|-----------|-------|-------|-------|
| (a)       | (b)   | (c)   | (d)   |
| (A) (i)   | (ii)  | (iv)  | (iii) |
| (B) (iii) | (iv)  | (ii)  | (i)   |
| (C) (ii)  | (i)   | (iii) | (iv)  |
| (D) (iv)  | (iii) | (i)   | (ii)  |

16. Name Japan's men-only island recommended by UNESCO to its World Heritage list in May 2017.  
 (A) Okinawa (B) Honshu (C) Amami Oshima (D) Okinoshima
17. Who has been appointed as the Chairperson of the Centre Board of Film Certification (CBFC) by the Central Government from 11<sup>th</sup> August 2017 for a period of three years ?  
 (A) Pahlaj Nihalani (B) Prasoon Joshi  
 (C) Anurag Srivastava (D) Mukesh Bhatt
18. Name the snake boat which won the 65<sup>th</sup> Nehru Trophy Boat Race on Punnamada Lake.  
 (A) Mahadevikad Chundan (B) Payippadan Chundan  
 (C) Karichal Chundan (D) Gabriel Chundan
19. Who among the following Indian-origin girl secured two points higher than Albert Einstein and Stephen Hawking in the British Mensa IQ Test (162 Points). ?  
 (A) Rajgauri Pawar (B) Rajmukhi Pawar  
 (C) Mukta Pawar (D) Neelam Pawar
20. Which is the currency of Republic of Kiribati ?  
 (A) U.S. Dollar (B) New Zealand Dollar  
 (C) Australian Dollar (D) Kina
21. Regulatory authority for the use of radiopharmaceuticals in India :  
 (A) FDA (B) AERB (C) RPC (D) All the above
22. If  $^{99m}\text{Tc}$ -MDP contains  $^{99m}\text{Tc}$ -pertechnetate as an impurity it will be accumulated in :  
 (A) Bone (B) Liver (C) Thyroid (D) All of the above
23. Radiochemical impurity expected in  $^{99m}\text{Tc}$  eluates is :  
 (A) Reduced hydrolysed technetium (B) Molybdenum - 98 species  
 (C) Molybdenum - 99 species (D) Sodium Pertechnetate
24. B.E.T Stands for :  
 (A) Bacterial Endotoxin Test (B) Bacterial Environment Test  
 (C) Biosafety Exhaust Test (D) Bacterial Exotoxin Test

25. In a Symbol  $^{131}\text{I}$ , the number 131 stands for :
- (A) number of neutrons (B) number of protons  
(C) number of electrons (D) number of nucleons
26. The presence of chemical impurities in  $^{99\text{m}}\text{Tc}$ -compounds will lead to :
- (A) undue toxicity (B) Poor labelling  
(C) both (A) and (B) (D) None of the above
27.  $^{99\text{m}}\text{Tc}$ -MIBI accumulates in myocardium by :
- (A) Active transport (B) Passive diffusion  
(C) Chemisorption (D) Compartment localisation
28. Cadmium rod is used in Nuclear Reactor as :
- (A) Moderator (B) Cladding material  
(C) Fuel (D) Control rod
29. In a period of six half lives, the activity of a material reduces to :
- (A) 1/16 of its initial activity (B) 1/8 of its initial activity  
(C) 1/32 of its initial activity (D) 1/64 of its initial activity
30. Enumeration of microbial contamination in environment is indicated by :
- (A) Colour development (B) Spore development  
(C) Colony development (D) None of the above
31.  $^{99}\text{Mo}$ - $^{99\text{m}}\text{Tc}$  generator system belongs to :
- (A) transient equilibrium (B) no equilibrium  
(C) secular equilibrium (D) None of the above
32. The most popular Bone imaging agent is :
- (A)  $^{99\text{m}}\text{Tc}$ -MDP (B)  $^{18\text{F}}$ -NaF (C)  $^{99\text{m}}\text{Tc}$  HEDP (D) F-18 FDG
33. Distinct property of  $^{201}\text{Tl}$  Chloride in Myocardial perfusion imaging compared to Technetium- $^{99\text{m}}$  agents.
- (A) infarct uptake (B) myocardial uptake  
(C) redistribution (D) tumour uptake

34.  $^{99m}\text{Tc(V)}$ -DMSA is useful for imaging :
- (A) Colorectal cancer (B) Medullary thyroid cancer  
(C) Differentiated thyroid cancer (D) Ovarian cancer
35.  $^{99m}\text{Tc}$ -ECD is preferable to  $^{99m}\text{Tc}$ -HMPAO because of :
- (A) ease of preparation (B) higher brain uptake  
(C) stereo specificity (D) in vitro stability
36. Radioimmunosciintigraphy is based on :
- (A) Immunotargetting (B) Receptor binding  
(C) Avidin-biotin system (D) None of the above
37. Iodine-123 is commercially obtained from :
- (A) Cyclotron (B) Generator (C) Reactor (D) All of the above
38. The best radiographic technique for early esophageal carcinoma is :
- (A) Computed tomography (B) Endoscopic ultrasound  
(C) Positron Emission Tomography (D) Double contrast barium study
39.  $^{201}\text{Tl}$ Thallos Chloride enters the myocardium by :
- (A) Reverse Osmosis (B)  $\text{Na}^+ - \text{K}^+$  ATPase pump  
(C) Passive Diffusion (D) None of the above
40. Biological Quality control testing includes :
- (A) Pyrogen test (B) Sterility test  
(C) Biodistribution studies (D) All of the above
41. In Radioimmunoassay, the relation between intensity of radioactivity and concentration of antigen in the test sample is :
- (A) Inverse (B) Direct (C) Exponential (D) No relation
42. Generator produced PET Tracer :
- (A) Rubidium - 81 (B) Technetium -  $^{99m}\text{Tc}$   
(C) Gallium - 68 (D) Indium -  $^{113m}\text{In}$

43. Dose limiting organ in most radionuclide therapies.  
 (A) Kidney (B) Bone marrow (C) Colon (D) Liver
44. PET Agent used for myocardial perfusion imaging :  
 (A)  $^{13}\text{N}$ -Ammonia (B)  $^{18}\text{F}$ -FDG  
 (C)  $^{99\text{m}}\text{Tc}$ -MIBI (D)  $^{201}\text{Tl}$ Thallium Chloride
45. Critical Organ in  $^{99\text{m}}\text{Tc}$ -MIBI myocardial perfusion imaging :  
 (A) Heart (B) Proximal colon (C) Liver (D) Stomach
46. Half life of Iodine-131 :  
 (A) 3 days (B) 13.6 hours (C) 8 days (D) 60 days
47. Radioisotope used for painful bone metastasis :  
 (A) Samarium 153 (B) Iodine 131  
 (C) Technetium 99m (D) Gallium 67
48.  $^{99\text{m}}\text{Tc}$ -sodium pertechnetate can be used for all the following except :  
 (A) Thyroid imaging (B) Salivary gland imaging  
 (C) Infection imaging (D) Meckels diverticulum detection
49. When performing Iodine-123 imaging, breast feeding can be safely resumed after ?  
 (A) 2 - 3 days (B) 12 to 24 hours  
 (C) 4 hours (D) cannot be resumed
50. Energy of Gamma rays emitted in Positron Emission Tomography :  
 (A) 140 keV (B) 511 keV (C) 364 keV (D) 185 keV
51. Incidence of thyroid cancer is higher in which thyroid scintigraphy pattern ?  
 (A) Hot nodule (B) Absence of thyroid uptake  
 (C) Homogenous increased uptake (D) Cold nodule
52. Most common false positive finding in parathyroid scanning :  
 (A) Thyroid adenoma (B) Parathyroid adenoma  
 (C) Parathyroid hyperplasia (D) Activity in oropharynx



53. In Bone Scan of a patient with known malignancy, chance of a solitary Rib lesion being malignant is :  
(A) 40-50%                      (B) 70-80%                      (C) 10-20%                      (D) 2-5%
54. Causes of positive Three phase bone scan can be all the following except :  
(A) Recent fracture                      (B) Soft tissue infection  
(C) Charcots joint                      (D) Osteomyelitis
55. In cholescintigraphy for evaluation of neonatal jaundice, absence of biliary clearance is consistent with :  
(A) Neonatal hepatitis                      (B) Acute cholecystitis  
(C) Chronic cholecystitis                      (D) Biliary Atresia
56. Radiopharmaceutical commonly used for measuring GFR :  
(A) Tc-99m MAG3                      (B) I-131 Ortho Iodo Hippurate (OIH)  
(C) Tc-99m DTPA                      (D) Tc-99m DMSA
57. Webster's rule applies to :  
(A) Dose calculation in renal insufficiency  
(B) Myocardial imaging  
(C) Cerebral perfusion imaging  
(D) Dose calculation in paediatrics
58. Captopril renography is done in the workup of :  
(A) Renal artery stenosis                      (B) Renal vein thrombosis  
(C) Pyelonephritis                      (D) None of the above
59. The accuracy of diuretic renography is affected by :  
(A) Renal function                      (B) Dose of diuretic  
(C) Bladder capacity                      (D) All of the above
60. The sensitivity of FDG PET is high in :  
(A) Primary hepatocellular carcinoma  
(B) Prostate carcinoma  
(C) Colorectal cancer  
(D) Renal carcinoma



70. Most common type of collimator used in gamma cameras :
- (A) Pin Hole Collimator (B) Parallel Hole Collimator  
(C) Diverging Collimator (D) Converging Collimator
71. In performing Quality control of a Gamma Camera, Spatial Resolution should be done :
- (A) daily (B) at installation (C) weekly (D) monthly
72. On a bone scan, pin hole collimation can be used in :
- (A) Legg-Calve-Perthes Disease (B) Multiple Myeloma  
(C) Rib Fracture (D) None of the above
73. Which Radiopharmaceutical among bone imaging agents is superior in localizing necrotic tissue ?
- (A) Tc-99m MDP (B) Tc-99m HDP  
(C) Tc-99m HEDP (D) Tc-99m pyrophosphate
74. Maximum predicted heart rate is calculated by :
- (A) 180-age (B) 240-age (C) 220-age (D) age in years  $\times$  4
75. Left anterior descending coronary artery supplies :
- (A) Anterior and lateral walls (B) Lateral and Posterior walls  
(C) Anterior wall and the septum (D) Inferior wall and right ventricle
76. Poor in vivo RBC labelling can be caused by :
- (A) drug interactions (B) incorrect amount of stannous ion  
(C) inappropriate procedure (D) all the above
77. Reduced ventricular contraction while assessing wall motion on a radionuclide ventriculogram is denoted as :
- (A) dyskinesis (B) hypokinesis (C) akinesis (D) tardokinesis

78. Tracers used in blood brain barrier imaging are all except :
- (A) Tc-99m pertechnetate (B) Tc-99m DTPA  
(C) Tc-99m ECD (D) Tc-99m Glucoheptonate
79. Best tracer to diagnose venous sinus thrombosis :
- (A) Tc-99m HMPAO (B) Tc-99m ECD  
(C) Tc-99m Glucoheptonate (D) Tc-99m RBCs
80. Paradoxical blocking of iodine incorporation into thyroid hormones from excess iodine :
- (A) Jod-Basedow phenomenon (B) Wolff - Chaikoff effect  
(C) Riedel's thyroiditis (D) Marine - Lenhart syndrome
81. Which of the following radiopharmaceuticals can be used in thyroid imaging ?
- (A) Tc-99m DMSA (B) F-18 FDG (C) Tc-99m MDP (D) Tc-99m HMPAO
82. Symmetric decrease in perfusion and metabolism in Alzheimers disease is seen in :
- (A) Posterior parietal lobe (B) Occipital lobe  
(C) Temporal parietal lobe (D) Frontal lobe
83. Specificity for detection of pheochromocytoma using I-131 MIBG imaging is around :
- (A) 95% (B) 60% (C) 90% (D) 80%
84. Sensitivity of a bone scan is highest for :
- (A) Prostate (B) Breast  
(C) Lung (D) Renal cell carcinoma
85. Though I-123 is the ideal thyroid imaging agent, it is not commonly used because of all the following except :
- (A) short half life (B) can be stored for future use  
(C) expensive (D) not readily available
86. Lugols iodine or potassium perchlorate to block thyroid uptake while administering I-131 MIBG should be continued for :
- (A) 24 hours (B) 48 hours (C) 7 days (D) 14 days

87. High probability of pulmonary emboli in the modified PLOPED Criteria :
- (A) multiple perfusion defects with associated radiographic opacities
  - (B) triple match: solitary moderate-large matching segmental defect with matching radiograph
  - (C) matched ventilation and perfusion defects with a normal chest radiograph
  - (D) any perfusion defect substantially larger than the radiographic abnormality
88. Sequence of performing ventilation and perfusion studies while using Xe-133 and Tc-99m respectively should be :
- (A) Perfusion study followed by ventilation study
  - (B) Ventilation study followed by perfusion study
  - (C) Both studies simultaneously
  - (D) Either studies can be performed in any sequence
89. Drug which is not used for pharmacological stress testing ?
- (A) Dipyridamole (B) Adenosine (C) Regadenoson (D) Metoprolol
90. Nuclear Sialography is performed using :
- (A) Tc-99m pertechnetate (B) Tc-99m sulfur colloid
  - (C) Ga-67 Citrate (D) Tc-99m labelled RBCs
91. The most important parameter which determines the actual amount of exposure the patient receives during a nuclear medicine procedure :
- (A) Biological half life (B) Physical half life
  - (C) Effective half life (D) Both (A) and (C)
92. Dose of recombinant human TSH injection used in Thyroid cancer imaging using Iodine - 131.
- (A) 0.3 mg for two consecutive days (B) 0.9 mg for two consecutive days
  - (C) 0.45 mg for two consecutive days (D) 0.6 mg for two consecutive days
93. The type of emissions used in radionuclide therapy are all except :
- (A) Beta rays (B) Gamma rays (C) Auger electrons (D) Alpha particles

94. An interaction in which a gamma photon loses all of its energy to an inner shell electron is :
- (A) Annihilation reaction                      (B) Pair production  
(C) Compton effect                              (D) Photoelectric effect
95. PET Tracer used in hypoxia imaging :
- (A) Gallium-68 Dotatate                      (B) F-18 misonidazole  
(C) F-18 FDG                                      (D) F-18 DOPA
96. Radionuclide used in palliative bone metastases treatment which can also be imaged :
- (A) Strontium-89                                  (B) Phosphorus-32  
(C) Rhenium-186                                (D) None of the above
97. False negative lung findings on a PET-CT is seen in :
- (A) Tuberculosis                                  (B) Squamous cell carcinoma  
(C) Sarcoidosis                                  (D) Bronchioalveolar carcinoma
98. In Prostate Carcinoma imaging which of the following is false ?
- (A) Most primary prostate carcinomas demonstrate high uptake of F-18 FDG  
(B) FDG PET is not reliable in differentiating carcinoma from benign prostate hypertrophy  
(C) FDG PET has less sensitivity in assessing lymphnode metastases  
(D) Bone scan is more sensitive than PET in detecting bone metastases
99. Low to moderate FDG uptake is seen in :
- (A) Hodgkins lymphoma                      (B) Peripheral T cell lymphoma  
(C) Diffuse large B-cell lymphoma      (D) Mantle cell lymphoma
100. High uptake in colon in an FDG PET can occur in :
- (A) Adenoma                      (B) Diverticulitis      (C) Carcinoma                      (D) Any of the above

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**SPACE FOR ROUGH WORK**

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