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Question paper-1 for the post of Senior Technical Assistant & Junior Technical Assistant

Instructions

1. **Part A** compulsory for all.
2. **Part B** compulsory for all.
3. **Part C** has 60 multiple choice questions (MCQs). Candidates have to attempt any 20 out of these 60, as per their choice.
4. For MCQs, each correct answer will be awarded 2 marks, and for each wrong answer there will be negative 0.5 marks.

PAPER I

Part A

1. In a certain code, 'FAME' is written as 'GZND'. How is 'MIND' coded in this code?
   (A) NHME
   (B) NJOC
   (C) NJME
   (D) NHOC

2. If A stands for 'x', B stands for '−', C stands for '+' what is the value of (8 C 6) A (8 B 6) = ?
   (A) 80
   (B) 28
   (C) 164
   (D) 24

3. Pointing to the man in the photograph, Rita said, "His son's father is my father." How is Rita related to the man?
   (A) Mother
   (B) Sister
   (C) Granddaughter
   (D) Daughter

4. 40 % of 56 + 56% of 40 = ?
   (A) 22.4
   (B) 44.6
   (C) 44.8
   (D) None of these

5. If A is twice as old as B and B is four times as old as C, then A is how many times older than C?
   (A) 2
   (B) 3
   (C) 6
   (D) 8

6. In a group of 50 students, 28 play basketball, 20 play hockey, and 12 play both. How many students play neither basketball nor hockey?
   (A) 14
   (B) 8
   (C) 12
   (D) 16

7. Which set of letters, when sequentially placed at the gaps in the letter series {GH_ _KG_I_K_M}, shall complete it?
   (A) IJHJL
   (B) IJGJL
   (C) IJHGL
   (D) IKHJL

8. Arrange these words in alphabetical order and select the one that comes third

1. Abandon 2. Acclaim 3. Accumulate 4. Accession 5. Achieve
(A) Acclaim
(B) Abandon
(C) Accession
(D) Accumulate

9. If today is Friday, what day will it be on the ninth day?
(A) Sunday
(B) Monday
(C) Tuesday
(D) Wednesday

10. The ratio of girls to boys in a class is 3:5. If there are 27 girls, how many boys are in the class?
(A) 9 boys
(B) 15 boys
(C) 40 boys
(D) 45 boys

11. Look at this series: 4, 2, 1, (1/2), (1/4), ... What number should come next?
(A) (1/3)
(B) (1/8)
(C) (1/32)
(D) (1/16)

12. CDS, EFT, GHU, ____, KLW
(A) MNC
(B) JIU
(C) IJV
(D) JTI

13. Statement I: *Tanya is older than Rahul.*
Statement II: *Rohan is older than Tanya.*
Statement III: *Rahul is older than Rohan.*
If the first two statements are true, the third statement is
(A) True
(B) False
(C) Uncertain
(D) More information required

14. Speedometer is to speed as Odometer is to
(A) Mileage
(B) Hiking
(C) Needle
(D) direction

15. Look at this series: 4, 10, 5, 11, 6, 12, ... What number should come next?
(A) 7
(B) 10
(C) 12
(D) 13

Part B

1. The author of the Harry Potter series is
   (A) Arundhati Roy
   (B) J.K. Rowling
   (C) Taslima Nasrin
   (D) Salman Rushdie

2. According to World Health Organisation (WHO), which countries have been certified as Malaria-free recently
   (A) India and Sri Lanka
   (B) Azerbaijan and Tajikistan
   (C) Pakistan and Tajikistan
   (D) Nepal and India

3. In the Indus Valley Civilization, the style of script is
   (A) Boustrophedon
   (B) Pictographic
   (C) Brahmi
   (D) Not deciphered yet

4. Kaziranga National Park is located in which state/UT of India?
   (A) Rajasthan
   (B) Gujarat
   (C) Assam
   (D) West Bengal

5. Which city is the host of the 'G20 Meeting of Agricultural Chief Scientists'?
   (A) Varanasi
   (B) Chandigarh
   (C) New Delhi
   (D) Shillong

6. Which case is famous for the definition of basic structure of the Indian Constitution?
   (A) Vishakha V Case
   (B) Romesh Thappar Case
   (C) Shreya Singhal Case
   (D) Kesavananda Bharati Case

7. Which city has been renamed as 'Chatrapati Sambhajinagar'?
   (A) Pune
   (B) Aurangabad
   (C) Nashik
   (D) Ahmed Nagar

8. Which is the largest marine sanctuary in India?
   (A) Marine National Park, Gulf of Kutch
   (B) Mahatma Gandhi Marine National Park, Andaman & Nicobar Islands
   (C) Gahirmatha Marine Sanctuary, Odisha
   (D) Gulf of Mannar Marine National Park, Tamil Nadu

9. What is the number of Schedules in the Constitution of India?
    (A) 8
    (B) 10
    (C) 11
    (D) 12

10. India's only active volcano is located at which among the following place?
    (A) Car Nicobar
    (B) Lakshadweep
    (C) Maya Bunder
    (D) Barren island

11. What is the antonym of 'Eminent'
    (A) Famous
    (B) Unknown
    (C) Leader
    (D) Well known

12. Synonym of 'massive'
    (A) Huge
    (B) Tiny
    (C) Small
    (D) Tall

13. Choose the correct word to complete this sentence, "I wish, I _____ the President."
    (A) was
    (B) were
    (C) can
    (D) would

14. Choose the correct article to complete the following sentence, "She is _____ nice girl."
    (A) the
    (B) a
    (C) an
    (D) none of the above

15. Fill in the correct preposition to complete the following sentence, "I will arrive _____ 9:30 am."
    (A) on
    (B) at
    (C) for
    (D) in

Part C

1. When the power of ocular lens is 10X and objective lens is 40X, the magnification is
    (A) 30 times
    (B) 20 times
    (C) 400 times

4

(D) 2000 times

2. Why an electron microscope gives higher magnification than an optical microscope
   (A) Because wavelength of electron used is small compared to that of visible light
   (B) Because electron microscope uses powerful lenses
   (C) Because of velocity of electron is less than that of light
   (D) Because electron have more energy than light particle

3. Fluid mosaic model describes:
   (A) Nucleus
   (B) Plasma membrane
   (C) Endoplasmic reticulum
   (D) Ribosome

4. Which of the following technique is used to study protein-protein interactions?
   (A) FRET
   (B) Microscopy
   (C) FRAP
   (D) Spectrometry

5. Which of the following cycle includes both anabolic and catabolic processes?
   (A) Glyoxylate
   (B) Citric acid cycle
   (C) Glycolysis
   (D) Lipid metabolism

6. Which of the following is a linker histone?
   (A) H2A
   (B) H3
   (C) H4
   (D) H1

7. Name the type of plasmid which has no identified function or phenotypic properties?
   (A) Cryptic plasmid
   (B) R-plasmid
   (C) F plasmid
   (D) Col plasmid

8. Out of the following, which law is also known as the law of purity of gametes?
   (A) Law of co-dominance
   (B) Law of independent assortment
   (C) Law of segregation
   (D) Law of dominance

9. What is a mode of replication of DNA in Eukaryotes?
   (A) Intermediate
   (B) Dispersive
   (C) Conservative
   (D) Semi-conservative

10. Emission spectrum occurs results when an electron in an atom undergoes a transition from
    (A) Higher energy level to a lower one
    (B) Lower energy level to a higher one

(C) Intermediate levels

(D) All of the mentioned

11. Which of the following is an agranular blood cell?

    (A) Monocyte

    (B) Basophils

    (C) Neutrophils

    (D) Eosinophils

12. Which of the following is NOT the component of water potential?

    (A) Osmotic potential

    (B) Pressure potential

    (C) Gravitational potential

    (D) Assimilation potential

13. Which light modulates osmoregulation of guard cell?

    (A) Green

    (B) Orange

    (C) Red

    (D) Blue

14. How many DNA duplexes are obtained from one DNA duplex after 3 cycles of PCR?

    (A) 8

    (B) 4

    (C) 32

    (D) 16

15. Which of the following statements is true about migration of biomolecules in electrophoresis?

    (A) The rate of migration is directly proportional to the resistance of medium

    (B) Rate of migration is directly proportional to current

    (C) Low voltage is used for separation of high mass molecules

    (D) Rate of migration is inversely proportional to current

16. Labelled antibodies are used to detect

    (A) The presence of a particular DNA molecule in Western blotting

    (B) The presence of a particular RNA molecule in Southern blotting

    (C) The presence of a particular DNA molecule in Southern blotting

    (D) The presence of a particular protein molecule in Western blotting

17. What is Dendrology?

    (A) Study of leaves

    (B) Study of trees

    (C) Study of climate

    (D) Study of soil

18. Non-membrane bound body of the nucleus which disappears in the late prophase and reappears in telophase

    (A) Nucleolus

    (B) Chromosome

    (C) Nucleoplasm

    (D) Nuclear pore

19. Which of the following plant growth regulators control the plant shoot formation?

    (A) Auxins

    (B) Cytokinins

(C) Ethylene

(D) Salicylic acid

20. Name the term given to the ability of single cells to divide and produce all the differentiated cell in the organism?

(A) Unipotent

(B) Pluripotent

(C) Multipotent

(D) Totipotency

21. Which of the following has acidic nature on the basis of Lewis Concept?

(A) CH_4

(B) B_2H_6

(C) NH_3

(D) H_2O

22. Select an ore used for the extraction of aluminium.

(A) Bauxite

(B) Dolomite

(C) Beryl

(D) Smithsonite

23. Choose an ion from the following that forms coloured complexes.

(A) Mg^{2+}

(B) Cu^+

(C) Al^{3+}

(D) Co^{3+}

24. Which of the following has tetrahedral geometry?

(A) $Si(CH_3)_4$

(B) PCl_5

(C) SF_4

(D) $PtCl_4^{2-}$

25. What is the crystal field stabilization energy for Fe^{3+} ion when $\Delta_o > P$?

(A) -20Dq + 2P

(B) 0

(C) -20 Dq

(D) +8 Dq

26. Choose most basic hydroxide of Lanthanides.

(A) $La(OH)_3$

(B) $Lu(OH)_3$

(C) $Pm(OH)_3$

(D) $Er(OH)_3$

27. Which organic species cause ozone depletion?

(A) Chlorofluorocarbons

(B) Hydrocarbons

(C) Surfactants

(D) Polyaromatic hydrocarbons

28. The metal ion not present in the human body is _____.

(A) Fe^{2+}

(B) Zn^{2+}

(C) Pd^{2+}

(D) Na^+

29. What is the relationship between K_p and K_c?

(A) $K_c = K_p(RT)^{\Delta n}$

(B) $K_c = K_p(RT)^{-\Delta n}$

(C) $K_p = K_c(RT)^{-\Delta n}$

(D) $K_c = K_p^{\Delta n}$

30. Which of the following is produced at cathode in corrosion?

    (A) H_2 gas

    (B) O_2 gas

    (C) Fe ions

    (D) $Fe(OH)_2$

31. What are the units of the rate constants for second order reaction?

    (A) mol litre sec^{-1}

    (B) mol litre^{-2} sec^{-1}

    (C) sec^{-1}

    (D) mol^{-1} litre sec^{-1}

32. Out of the following, which metal does not form colloidal solution by Bredig's arc method?

    (A) Ag

    (B) Pt

    (C) Fe

    (D) Au

33. If α is the degree of dissociation of Na_2SO_4, what will be the van't Hoff factor 'i'?

    (A) $1+\alpha$

    (B) $1-\alpha$

    (C) $1-2\alpha$

    (D) $1+2\alpha$

34. What is the number of possible alkynes with C_5H_8 formula?

    (A) 5

    (B) 4

    (C) 3

    (D) 2

35. Which of following is formed as precipitates when aldehyde is heated with Fehling's solution

    (A) Cu

    (B) CuO

    (C) Cu_2O

    (D) $Cu+CuO+Cu_2O$

36. Which is correct about the nature of carbon-carbon bond in CaC_2?

    (A) one sigma and one pi bond

    (B) one sigma bond

    (C) No bond

    (D) One sigma and two pi bonds

37. Choose least stable species among the following.

    (A) $(CH_3)_3C^-$

    (B) $(CH_3)_2CH^-$

    (C) $CH_3CH_2^-$

    (D) $C_6H_5CH_2^-$

38. Out of the following, choose a reagent that acts as an electrophile?

    (A) H_2O

    (B) $AlCl_3$

(C) $C_6H_5NH_2$

(D) NH_3

39. Which of the following gas decolorizes alkaline $KMnO_4$ solution but does not give precipitate with $AgNO_3$?

(A) CH_4

(B) C_2H_4

·(C) C_2H_2

(D) C_2H_6

40. Which condition is necessary for organic molecules to show optical activity?

(A) Asymmetric C atom

(B) non-planar structure

(C) non-superimposable mirror image

(D) superimposable mirror image

41. If E, l, M and G denote energy, angular momentum, mass and universal gravitational constant respectively, then the dimension of $(E\, l^2)/(MG^2)$ will be that of

(A) Length

(B) angle

(C) time

(D) mass

42. Which of the following is correct?

(A) 1 trillion = 10^9

(B) 1 μm = 100 °A

(C) 1 nm = 10 °A

(D) 1 pm = 1000 °A

43. At a given temperature T, in the earth's atmosphere, which of the following is least abundant?

(A) Nitrogen molecules

(B) Hydrogen molecules

(C) Oxygen molecules

(D) Carbon dioxide molecules

44. When illuminated with green light, the petals of a red rose appear

(A) black

(B) green

(C) red

(D) yellow

45. Which one of the following materials cannot be used to make a lens?

(A) Glass

(B) Clay

(C) Water

(D) Plastic

46. If you walk directly towards a plane mirror at a speed v, the speed at which your image approaches you is

(A) v/2

(B) v

(C) 2 v

(D) zero

47. There are 'n' resistors, each of resistance R. R_s is the equivalent resistance of their series combination. R_p is the equivalent resistance of their parallel combination. The ratio R_p / R_s is equal to

(A) 1/ n

(B) n

(C) n^2

(D) $1/n^2$

48. In case uncertainty in the measured values A =27.153, B=138.2 and C=11.74is represented by significant figures, then value of calculated Y= (A+B-C) will be represented by

    (A) 153.613

    (B) 153.61

    (C) 153.6

    (D) 154

49. The number of distinct (n, l, m) states of a hydrogen atom with n=3 are

    (A) 12

    (B) 9

    (C) 3

    (D) 2

50. The Z-value of a nucleus does not change in

    (A) alpha decay

    (B) beta decay

    (C) gamma decay

    (D) none of the above

51. Which of the following is not associated with LASER phenomena?

    (A) Stimulated emission

    (B) population inversion

    (C) existence of meta stable state

    (D) spontaneous emission

52. A light wave has a frequency 4×10^{14} cycles/sec and a wavelength 5×10^{-7} meters. What is the index of refraction of the medium in which it is travelling? (Velocity of light in empty space $=3 \times 10^8$ meter/sec)

    (A) 2/3

    (B) 3/2

    (C) 3/20

    (D) 1/2

53. If the polar ice caps were to completely melt due to global warming, the melted ice would redistribute itself over the earth. How this would affect the length of the day? Assume that sun, moon and other planets exert negligible torque on the earth.

    (A) Length of day will increase slightly

    (B) Length of the day will decrease slightly

    (C) No change in the length of day

    (D) none of the above

54. Radiation occurs

    (A) only from liquids

    (B) only from solids

    (C) only from gases

    (D) from solids, liquids and gases

55. A barrel 5 meter high is filled with a liquid. When a tap at the bottom of the barrel is opened, with what velocity does the liquid emerge? (assume $g= 10$ m/sec^2)

    (A) 10 m/sec

    (B) 5 m / sec

    (C) 2 m/sec

(D) 100 m/sec

56. A coin of mass 'm' rolls along a horizontal table with velocity 'v'. Its total kinetic energy is
  (A) $\frac{1}{2} m v^2$
  (B) $\frac{3}{4} m v^2$
  (C) $m v^2$
  (D) depends on coin mass

57. Which phenomena is not associated with superconductivity
  (A) Cooper Pair
  (B) Asymptotic freedom
  (C) Meissner effect
  (D) large conductivity

58. Clear day-time sky appearing blue can be explained by
  (A) Compton scattering
  (B) Bhabha Scattering
  (C) Rayleigh scattering
  (D) Møller scattering

59. The electrons in an atom
  (A) are permanently bound to it.
  (B) are some distance from the nucleus.
  (C) have more mass than the nucleus.
  (D) may have positive or negative charges.

60. Steam at 100° C is more dangerous than the same mass of water at 100° C because the steam
  (A) has a higher specific heat capacity
  (B) moves faster
  (C) is less dense.
  (D) contains more internal energy