118/2025

Question Booklet Alpha Code **A**

Question Booklet Serial Number

Total No. of questions : 100 Time : 1 Hour 30 Minutes

Maximum : 100 Marks

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.

118/2025

Maximum : 100 marks

Time : 1 hour and 30 minutes

1. Neoprene is chemically known as :

(A) Thermo Plastic elastomer (B) SBR

(C) Poly chloroprene (D) Acrylo nitrile butadiene

2. The trade name for polyester fibre is :

(A) Teflon (B) Terlene

(C) Nylon (D) Viton

3. Buna-S is :

(A) Rubber (B) Plastic

(C) Ceramic (D) Fibre

4. Bakelite is produced by the condensation polymerization of _____ and _____.

(A) phenol and urea (B) urea and formaldehyde

(C) phenol and formaldehyde (D) formaldehyde and melamine

5. Which of the following polymer has transparency?

(A) Poly methyl methacrylate (B) Poly melamine formaldehyde

(C) LDPE (D) Poly vinyl acetate

6. Which of the following is a copolymer?

(A) PVC (B) SBR

(C) CR (D) Teflon

7. What is the apparatus that is utilized to add measured volumes of solution during titration?

(A) Measuring jar (B) Burette

(C) Titration flask (D) Funnel

8. What is required on an analytical balance to measure mass less than 10 mg with precision?

(A) weight box (B) weighing bottle

(C) rider (D) pan

9. Which apparatus is utilized to burn the rubber in the ash content experiment?
(A) Petrydish
(B) Ashtray
(C) Silicone crucible
(D) Silica crucible

10. Which type of centrifuge is used for determining the sludge content of latex?
(A) De Laval
(B) Alfa Laval
(C) Centrifuge with 2300 rpm
(D) Centrifuge with 6000 rpm

11. What is the size of the sieve used for determining coagulum content?
(A) 180 microns
(B) 80 microns
(C) 18 microns
(D) 100 microns

12. What is the friction ratio of a lab size mixing mill?
(A) 1 : 1
(B) 1 : 1.25
(C) 1 : 2
(D) 1.25 : 1

13. What is the function of Vernier disc in a mixing mill?
(A) for the required uniform nip adjustment of rolls
(B) reduce thickness
(C) increase thickness
(D) control speed

14. What is the principle behind a hydraulic press?
(A) Poisson's equation
(B) Newton's law
(C) Bernoulli's theorem
(D) Pascal's law

15. Which equipment provides data on the mass flow rate of plastic material per 10 minutes?
(A) ODR
(B) Mooney viscometer
(C) Melt flow index tester
(D) Flow meter

16. The ratio of the energy of the intender after impact to its energy before impact. This principle is belonging to which experiment?
(A) Hardness
(B) Rebound resilience
(C) Tension set
(D) Compression set

17. What is the rotational frequency of the cylindrical drum of Din Abrader?
(A) 40 +/–1 rpm
(B) 80 +/–1 rpm
(C) 45 +/–1 rpm
(D) 50 +/–5 rpm

18. Modulus of rubber sample is determined by using :

(A) Universal testing machine
(B) Durometer
(C) Tension set apparatus
(D) Tripsometer

19. What is the optimum pH content required to get better DRC in creaming of NR latex?

(A) Less than 7
(B) 7 to 9.5
(C) 9.5 to 10.8
(D) 10.8 to 11.8

20. What is the ammonia content usually preferred in low ammonia pentachlorophenate (LA-SPP) system?

(A) Less than 0.2%
(B) 0.2%
(C) 0.5%
(D) 0.75%

21. Which is not the content of LABZ system?

(A) ZDC
(B) TMTD
(C) ZnO
(D) Ammonia

22. Which is the anticoagulant usually using in CV rubber?

(A) LATZ
(B) Boric acid and Ammonia
(C) Sodium sulphite
(D) Hydroxylamine and ammonia

23. Which anticoagulant is not preferred to prevent pre-coagulation of latex using for manufacturing of crepe rubber due to discolouration?

(A) Ammonia
(B) LATZ
(C) Sodium sulphite
(D) Formalin

24. Why removal of magnesium in NR latex is essential?

(A) It increases oxidative degradation
(B) It decreases destabilization
(C) It stimulates bacterial proliferation
(D) It decreases the rate of coagulation

25. Standard Revertex latex is the latex concentrated by _____ method

(A) Creaming
(B) Evaporation
(C) Centrifugation process
(D) Electrodecantation

26. Which ISNR grade is using to manufacture pharmaceutical products?

(A) ISNR 3L
(B) ISNR 10
(C) ISNR CV
(D) All of these

27. Which of the following acts as enzyme poison thereby inhibiting VFA formation in low ammonia preservative systems?

(A) TMTD
(B) ZDC
(C) ZnO
(D) Lauric acid

28. The creaming agent used in natural rubber latex is/are :

(A) Tamarind seed powder
(B) Ammonium Alginate
(C) Sodium Alginate
(D) All of these

29. How can we predict protein content from nitrogen content?

(A) $6 \times$ Nitrogen content
(B) $6.25 \times$ Nitrogen content
(C) $6.5 \times$ Nitrogen content
(D) $6.75 \times$ Nitrogen content

30. Which Indian standard is used to find out the volatile matter of natural rubber?

(A) 3660 (part 1) 1972
(B) 3400 (part XI) 1969
(C) 3400 (part XXI) 1980
(D) 3708 (part 8) 2005

31. Nitrogen content in raw NR is estimated by converting it into _____ using catalytic digestion.

(A) Nitric acid
(B) Ammonia
(C) Ammonium chloride
(D) Ammonium hydroxide

32. The maximum possible amount of Ash content in ISNR 10 is :

(A) 0.50%
(B) 0.60%
(C) 0.75%
(D) 1.00%

33. The rate travel of power actuated grip shall be _____ in rubber tensile strength testing according to IS 3400.

(A) 50 mm/min
(B) 75 mm/min
(C) 100 mm/min
(D) 500 mm/min

34. The decrease in thickness of a rubber which has been deformed under specific conditions of load, time and temperature is determined using :

(A) ASTM D 468
(B) ASTM D 790
(C) ASTM D 412
(D) ASTM D 395

35. What is the test temperature adopting in tear strength testing of rubber vulcanizate according to IS 3400?

(A) 25 ± 2°C (B) 25 ± 5°C

(C) 27 ± 2°C (D) 27 ± 5°C

36. The hardness scale used for flexible rubber is :

(A) Shore 0 (B) Shore D

(C) Shore B (D) Shore A

37. Which ASTM standard is used for conducting an abrasion test of rubber samples using a DIN abrader?

(A) ASTM D 4649 (B) ASTM D 5359

(C) ASTM D 5963 (D) ASTM D 412

38. What is the peptizer using in the determination of dirt content of natural rubber?

(A) Potassium Chloride (B) Copper sulphate

(C) Copper oleate (D) Zinc Oxide

39. Which of the following is the density range of High Density Polyethylene (HDPE)?

(A) 0.910 to 0.929 g/cm^3 (B) 0.930 to 0.939 g/cm^3

(C) Above 1.0 g/cm^3 (D) 0.941 to 0.965 g/cm^3

40. The high melting point of Polypropylene (PP) is approximately :

(A) 165°C (B) 200°C

(C) 250°C (D) 120°C

41. Which property makes UPVC (Unplasticized Polyvinyl Chloride) suitable for outdoor applications?

(A) High flexibility (B) High water absorption

(C) Good weathering resistance (D) High crystallinity

42. In flotation test, a sample floats in water. This indicates :

(A) PVC (Polyvinyl Chloride) (B) PP (Polypropylene)

(C) Nylon (D) Acrylic

43. Which material is often called "Bakelite"?

(A) Phenol formaldehyde (B) Epoxy resin

(C) Polypropylene (D) Nylon 6

44. In sodium fusion extract test, a white precipitate soluble in ammonia indicates the presence of :

(A) Sulphur
(B) Nitrogen
(C) Phosphorus
(D) Chlorine

45. The rigidity of polystyrene is mainly due to the presence of :

(A) Methyl group
(B) Phenylene ring
(C) Carboxyl group
(D) Hydroxyl group

46. Which additive is used to improve flexibility and plasticity of PVC?

(A) Filler
(B) Pigment
(C) Plasticizer
(D) Catalyst

47. Which is a common thixotropic agent in FRP?

(A) Cobalt octoate
(B) Fumed silica
(C) Antimony oxide
(D) Benzophenone

48. The term "green strength" in rubber refers to :

(A) Strength of uncured rubber
(B) Resistance to aging
(C) Environmental safety of rubber
(D) Elasticity after vulcanization

49. Plasticizers are classified under which main ingredient group?

(A) Activators
(B) Fillers
(C) Antioxidants
(D) Softners

50. Which coupling agent improves resin-fiber bonding in FRP?

(A) Phenol
(B) Silane
(C) Polyvinyl alcohol (PVA)
(D) Polyethylene glycol

51. In Chloroprene Rubber (CR) vulcanization, combination of which metallic oxides are used?

(A) Zinc oxide (ZnO) and Beryllium oxide (BeO)
(B) Calcium oxide (CaO) and Zinc oxide (ZnO)
(C) Zinc oxide (ZnO) and magnesium oxide (MgO)
(D) Aluminum oxide (Al_2O_3) and Zinc oxide (ZnO)

52. Which reinforcement material is most commonly used in boat hulls?

(A) Carbon fiber (B) Glass fiber

(C) Aramid fiber (D) Bron fiber

53. Which residual monomer is associated with liver angiosarcoma in humans?

(A) Butadiene (B) Propylene

(C) Styrene (D) Vinyl chloride

54. The process of converting uncured rubber into an elastic state is called :

(A) Polymerization (B) Moulding

(C) Vulcanization (D) Degradation

55. Which resin is a mild to moderate skin irritant but becomes non toxic after curing?

(A) Epoxy resin (B) Polyester resin

(C) Phenolic resin (D) Vinyl resin

56. Which resin is used for decorative laminates and table wares due to its excellent resistance to hot water?

(A) Urea-formaldehyde (B) Melamine Formaldehyde

(C) Phenolic (D) Furan

57. Phenol vapours may cause :

(A) Hair loss (B) Faster curing

(C) Hearing loss (D) Respiratory irritation

58. The primary vulcanizing agent used in most rubber compound is :

(A) Zinc oxide (ZnO) (B) Sulphur

(C) Carbon black (D) Stearic acid

59. The monomers of butyl rubber are:

(A) Butadiene and Isobutylene (B) Isobutylene and Isoprene

(C) Butadiene and Styrene (D) Butadiene and Acrylonitrile

60. Which of the following statements are correct for butyl rubber?

(i) Very low gum tensile strength

(ii) Low resilience

(iii) Very low gas permeability

(iv) Excellent Ozone resistance

(A) (i) and (ii) (B) (ii) and (iii)

(C) (ii), (iii) and (iv) (D) All of these

61. Which Plasticiser is most suitable with NBR?

(A) Ester type (B) Aromatic oil

(C) Paraffinic oil (D) Naphthenic oil

62. Fuel hose is made of:

(A) IIR (B) NBR

(C) SBR (D) PBD

63. Which of the following rubber have highest resilience?

(A) Butyl rubber (B) PBD

(C) NR (D) SBR

64. Which curing system results in excellent aging properties in butyl rubber Vulcanisates?

(A) Sulphur curing (B) Peroxide curing

(C) Quinone dixime curing (D) Resin curing

65. The blend that combine the oil resistance, chemical resistance and flame resistance is :

(A) NBR/EPDM (B) NBR/SBR

(C) NBR/PVC (D) NBR/PBR

66. As the ACN content of NBR increases:

(i) Elasticity increases

(ii) Abrasion resistance increases

(iii) Compatibility with plasticiser improves

(iv) Low temperature flexibility improves

(A) Both (i) and (ii) (B) Both (ii) and (iii)

(C) Both (iii) and (iv) (D) All of these

67. Heater bands used for heating the barrel of injection moulding machine is of :

(1) Tubular heater

(2) Catridge heater

(3) Band heater

(4) Natural gas heater

(A) Both (1) and (2) (B) Both (1) and (4)

(C) (3) (D) All of these

68. Low compression ratio screw is used for :

(A) PET (B) PMMA

(C) PTFE (D) All of these

69. Which of the following extruder is best for producing products with reduced porosity?

(A) Cavity transfer extruder
(B) Pin extruder
(C) Vented extruder
(D) Twin screw extruder

70. Tangential rotors are the peculiarities of :

(A) Banbury mixer
(B) Intermix
(C) Extruder
(D) Two roll mixing mill

71. Friction ratio of industrial two roll mixing mill is usually :

(A) 1:2 to 1:4
(B) 1:1 to 1:1.25
(C) 1:1 to 1:1.4
(D) 1:1 to 1:2

72. Working principle of hydraulic press is based on :

(A) Newton's law
(B) Power law
(C) Pascals law
(D) Poisson's law

73. What are the advantages of cold feed extruder?

(1) Lower capital cost of equipment
(2) Reduced labour cost
(3) Better temperature control
(4) Better dimensional control of the extruder

(A) (1) and (2)
(B) (2) and (3)
(C) (2) and (4)
(D) All of these

74. The primary method for manufacturing jugs with integral handles is :

(A) Injection blow moulding
(B) Extrusion blow moulding
(C) Injection moulding
(D) All of these

75. What is the function of styrene in unsaturated polyester based FRP formulation?

(A) Diluent and crosslinking agent
(B) Diluent
(C) Finishing agent
(D) Accelerator

76. The reduction in size of particle agglomerate during mixing is achieved by :

(A) Subdivision
(B) Distributive mixing
(C) Dispersive mixing
(D) Viscosity reduction

77. Which of the following statements are correct for the location of the gate in injection mould?

(i) Location and size of the gate should be in a location where part functionality is not compromised

(ii) Gating is recommended at the thickest section of the part

(iii) The gate should not be located where the material can flow into a wall.

(iv) Gate should be located so that flow occur around core pins and holes

(A) (i) and (ii)
(B) (i) and (iii)
(C) (ii) and (iii)
(D) All of these

78. The method of producing plastic film and sheet by squeezing the plastic through the gap between two counter rotating cylinder is :

(A) Extrusion
(B) Calendering
(C) Sheet moulding
(D) Thermoforming

79. The percentage by weight of the whole which is non-volatile in NR latex at a definite temperature in an open atmosphere is called :

(A) Ash content
(B) TSC
(C) DRC
(D) All of the above

80. Device in chemical laboratory to protect from hazardous fumes, vapours and dust generated during experiments is :

(A) Fume cupboard
(B) Exhaust fan
(C) Windows and doors
(D) None of the above

81. High VFA in NR latex tend to :

(A) Stabilise the latex
(B) Destabilise the latex
(C) Changes the DRC of latex
(D) Changes the TSC of Latex

82. Sludge content of latex can be determine using :

(A) Brookfield viscometer
(B) Ageing oven
(C) Centrifuge
(D) Ubbelohde viscometer

83. Sieve residue is also called :

(A) Magnesium content
(B) Sludge content
(C) Dirt content
(D) Coagulum content

84. Induction period of creaming of latex is prolonged when :

(A) Low DRC latex is used

(B) More amount of creaming agent than optimum quantity is used

(C) Aged latex is used

(D) Less amount of creaming agent than optimum is used

85. For getting a good dispersion the critical speed of rotation of jars is given by :

(A) $R = 54.2/S$ (B) $S = 54.2/R^2$

(C) $S = 54.2/R$ (D) $S = 45.2/R$

86. Mixture of two liquids where one liquid is dispersed as droplets within the other is called:

(A) Dispersion (B) Surfactant

(C) Emulsion (D) Plasticiser

87. Density of serum of NR latex is :

(A) 1.02 g/cm^3 (B) 1.0 g/cm^3

(C) 0.97 g/cm^3 (D) None of the above

88. The free alkali content of High ammonia latex is :

(A) 0.5% max (B) 0.6% minimum

(C) 0.3% minimum (D) 2.0% minimum

89. 0.01N Oxalic acid solution is prepared in a 100 ml standard flask. The weight of Oxalic acid used to make the solution is :

(A) 126 g (B) 63 g

(C) 12.6 g (D) 6.3 g

90. An accurate device used in titration having a capacity of 50 ml and graduated to 0.1 ml.

(A) Pipette (B) Measuring vessel

(C) Thermometer (D) Burette

91. Indicator used for titration between strong acid and strong base is :

(A) Methyl Red (B) Methyl Orange

(C) Phenolphthalein (D) Methylene blue

92. Identify the poisonous chemical :

(A) NaOH (B) Na_2CO_3

(C) $AgNO_3$ (D) Alcohol

93. Dicumyl Peroxide is used in Laboratories as :

(A) Accelerator (B) Vulcanising agent

(C) Filler (D) Antioxidant

94. In Kjeldhal method trapping solution for ammonia is :

(A) Sulphuric acid (B) Silver nitrate

(C) Lime water (D) Boric acid

95. Concentrated acids are always added to water for diluting in order to take care of :

(A) Exothermicity (B) Enthalpy of solution

(C) Enthalpy of dissolution (D) All of the above

96. The indicator used in the titration of Oxalic acid with NaOH solution is :

(A) Phenolphthalein (B) Bromophenol blue

(C) Methyl Orange (D) Methyl Red

97. An indicator that is red in acidic solution and yellow in Basic solution is :

(A) Methylene blue (B) Methyl red

(C) Phenolphthalein (D) Methyl Orange

98. 0.005 M EDTA disodium salt Dihydrate solution is prepared by dissolving :

(A) 1.36 g in 1 litre water (B) 2.24 g in 1 litre water

(C) 1.86 g in 1 litre water (D) 0.38 g in 1 litre water

99. Identify the type of chemical which must be stored under water :

(A) Carcinogenic chemicals (B) Explosive chemicals

(C) Corrosive chemicals (D) All of the above

100. The display symbol Skull and Cross bone on lab reagent containers indicate :

(A) Flammable materials (B) Acute toxicity

(C) Explosive (D) Harmful to environment

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