

93/2015

Maximum : 100 marks

Time : 1 hour and 15 minutes

1. A chemical reaction will occur spontaneously at constant pressure and temperature, if the free energy is :
(A) Zero (B) +VE
(C) -VE (D) None of these
2. Entropy is a measure of the _____ of a system.
(A) Temperature changes only (B) Disorder
(C) Orderly behavior (D) None of these
3. Fundamental principle of refrigeration is based on the _____ law of thermodynamics.
(A) Second (B) Zeroth
(C) First (D) Third
4. Heating of water under atmospheric pressure is an _____ process.
(A) Isochoric (B) Adiabatic
(C) Isobaric (D) Isothermal
5. Molten soap mass is transported by a _____ pump.
(A) Diaphragm (B) Reciprocating
(C) Gear (D) Centrifugal
6. Most commonly used joint in the underground pipe line is the :
(A) Sleeve joint (B) Flanged joint
(C) Coupling (D) Expansion joint
7. The fluid property due to which, mercury does not wet the glass :
(A) Cohesion (B) Surface tension
(C) Viscosity (D) Adhesion

A

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[P.T.O.]

8. Check valves are used :
- (A) At high pressure (B) For unidirectional flow
(C) In bends (D) For controlling water flow
9. The ratio of inertial forces to elastic forces is called the _____ number.
- (A) Reynolds (B) Euler
(C) Mach (D) Weber
10. Which of the following has the minimum absorptivity?
- (A) Aluminium foils (B) Coal dust
(C) Refractory bricks (D) Iron plates
11. Mode of heat transfer involved in the cooling of air cooled internal combustion engine is :
- (A) Conduction (B) Forced convection
(C) Radiation (D) Natural convection
12. Which of the following has maximum thermal conductivity?
- (A) Coal (B) Iron
(C) Nitrogen (D) Tar
13. Open pan evaporators are preferred to be used, when the solution to be concentrated is :
- (A) Scaling (B) Salty
(C) Highly viscous (D) Corrosive
14. Which of the following is most suitable for cold viscous feed?
- (A) Forward feed (B) Backward feed
(C) Mixed feed (D) Parallel feed
15. Heat transfer occurs by natural convection because change in temperature causes difference in :
- (A) Viscosity (B) Density
(C) Thermal conductivity (D) Heat capacity

16. Separation of two or more components of a liquid solution cannot be achieved by :
- (A) Absorption (B) Fractional crystallization
(C) Liquid extraction (D) Evaporation
17. Which of the following provides maximum contact surface for a liquid-vapour system?
- (A) Bubble-cap plate column (B) Wetted wall column
(C) Packed tower (D) Sieve-plate column
18. Which is the separation technique used for desalination of sea water?
- (A) Reverse osmosis (B) Adsorption
(C) Absorption (D) Thermal diffusion
19. Rate of adsorption increases as the :
- (A) Size of adsorbent increases (B) Pressure decreases
(C) Temperature decreases (D) Temperature increases
20. The number of gram moles of solute per kilogram of solvent is called :
- (A) Normality (B) Molarity
(C) Molecular weight (D) Molality
21. Separation of a mixture of two gases by absorption in the liquid solvent depends upon the difference in their :
- (A) Viscosity (B) Density
(C) Relative volatility (D) Solubility
22. Use of packed towers for distillation is generally limited to the :
- (A) Small sizes (B) Multicomponent distillation
(C) High pressure operation (D) Vacuum distillation
23. Calcium Ammonium Nitrate (CAN) is :
- (A) A complex fertilizer (B) A mixed fertilizer
(C) An explosive (D) A straight fertilizer

24. Ammonia synthesis gas is produced from natural gas by :
- (A) Partial oxidation (B) Thermal cracking
(C) Hydrogenation (D) Steam reforming
25. Catalyst used in Haber's process for ammonia production is :
- (A) Nickel (B) Reduced iron oxide
(C) Vanadium Pentoxide (D) Silica gel
26. Triple superphosphate is made by reacting phosphate rock with _____ acid.
- (A) Sulphuric (B) Phosphoric
(C) Nitric (D) Hydrochloric
27. Urea is produced from carbon dioxide and :
- (A) Nitric Oxide (B) Ammonium Nitrate
(C) Ammonia (D) Nitric acid
28. A solution with reasonably permanent pH is called a/an _____ solution.
- (A) Colloidal (B) Buffer
(C) Non-ideal (D) Ideal
29. Isotonic solutions must have the same :
- (A) Normality (B) Viscosity
(C) Critical temperature (D) Molar concentration
30. With increase in temperature, the surface tension of water :
- (A) Decreases (B) Increases linearly
(C) Increases (D) Remains constant
31. Poly Vinyl Chloride (PVC) is a _____ material.
- (A) Thermoplastic (B) Thermosetting
(C) Fibrous (D) Chemically active

32. Out of the following, the joint produced by _____ has the lower strength.
- (A) Soldering (B) Welding
(C) Brazing (D) Rivetting
33. Heating of an ore below its melting point in presence of excess of air is called :
- (A) Calcination (B) Smelting
(C) Roasting (D) Sublimation
34. Psychrometer determines the :
- (A) Humidity of gases (B) Moisture content of the solids
(C) Water of crystallization (D) Hygroscopic nature of solids
35. What is the absorptivity of a black body?
- (A) 1 (B) 0
(C) 0.95 (D) 0.78
36. Which of the following has the highest flash point of all?
- (A) Diesel (B) Kerosene
(C) Petrol (D) Furnace oil
37. Octane number of gasoline is a measure of its :
- (A) Knocking tendency (B) Ignition delay
(C) Ignition temperature (D) Smoke point
38. Flash point of an oil is determined by the :
- (A) Ramsbottom apparatus (B) Pensky Martens apparatus
(C) Redwood viscometer (D) Conradson apparatus
39. Glycerin is a by-product of the _____ industry.
- (A) Paint (B) Oil hydrogenation
(C) Soap (D) Detergent
40. CaO is called:
- (A) Slaked lime (B) Quick lime
(C) Calcite (D) Limestone

41. A device used to remove condensate from steam heated equipment is :
- (A) Coils (B) Kettles
(C) Condensers (D) Traps
42. Centistokes is unit of :
- (A) Absolute viscosity (B) Kinematic viscosity
(C) Pressure (D) Surface tension
43. Joule- Thomson co-efficient for an ideal gas is :
- (A) 1 (B) -1
(C) 0 (D) ∞
44. Which is an example of reciprocating pump?
- (A) Gear pump (B) Screw pump
(C) Lobe pump (D) Diaphragm pump
45. Manometers are used to measure :
- (A) Flow rate (B) Viscosity
(C) Pressure difference (D) Atmospheric pressure
46. Which of the following enzymes helps breaking down of starch into maltose?
- (A) Amylase (B) Zymase
(C) Invertase (D) Pepsin
47. In a dry cell, the cathode used is :
- (A) Iron (B) Zinc
(C) Aluminium (D) Graphite
48. The activation energy of a reaction can be lowered by :
- (A) Raising temperature (B) Lowering temperature
(C) Removing products (D) Adding a catalyst
49. Sodium salts of fatty acids are known as :
- (A) Vegetable oils (B) Gasoline
(C) Soaps (D) Detergents

50. Alkyl halides on treatment with aqueous KOH gives :
- (A) Acids (B) Alcohols
(C) Aldehydes (D) Alkanes
51. Chloroform is used as :
- (A) Fertilizer (B) Fuel
(C) Detergent (D) Anaesthetic
52. Formalin is an aqueous solution of :
- (A) Formyl Chloride (B) Formamide
(C) Formaldehyde (D) Formic acid
53. Which of the following has highest solubility in water?
- (A) Acetic acid (B) Propionic acid
(C) Benzoic acid (D) n-butyric acid
54. Aniline is purified by :
- (A) Simple distillation (B) Steam distillation
(C) Vacuum distillation (D) Extraction with a solvent
55. The oxidation number of Sulphur in SO_2 is :
- (A) +2 (B) +4
(C) -2 (D) -4
56. The most radioactive element is :
- (A) Uranium (B) Radium
(C) Polonium (D) Thorium
57. The basic principle used in hydrogen bomb is :
- (A) Nuclear fission (B) Nuclear disintegration
(C) Nuclear fusion (D) Neutron splitting
58. The process of vulcanization makes rubber :
- (A) Soluble in water (B) Soft
(C) Less elastic (D) Hard

59. Which of the following is an addition polymer?
(A) Glucose (B) Ethylene
(C) Terylene (D) Polyethylene
60. Biochemical reactions which can take place in the absence of oxygen are called :
(A) Metabolic (B) Aerobic
(C) Anaerobic (D) Glycolysis
61. Turbidity of water is an indication of the presence of :
(A) Suspended inorganic matter (B) Dissolved solids
(C) Floating solids (D) Dissolved gases
62. Which of the following is not categorized as a "mechanical Operation"?
(A) Agitation (B) Filtration
(C) Size reduction (D) Humidification
63. Invar used in thermocouples is an alloy of nickel and :
(A) Iron (B) Copper
(C) Chromium (D) Lead
64. A good lubricant should have high :
(A) Viscosity index (B) Volatility
(C) Pour point (D) None of these
65. When vaporization takes place directly at the heating surface, it is called?
(A) Film boiling (B) Vapour binding
(C) Nucleate boiling (D) None of these
66. The number of kilogram of water vapourized per kilogram of steam fed to the evaporator is defined as :
(A) Capacity (B) Rate of evaporation
(C) Rate of vapourization (D) Economy
67. Pascal is the unit for :
(A) Temperature (B) Pressure
(C) Frequency (D) Conductivity

68. Radio carbon dating technique is used to estimate the age of :
(A) Rocks (B) Monumentts
(C) Soil (D) Fossils
69. One nanometer is equal to :
(A) 10^{-6} (B) 10^{-8}
(C) 10^{-9} (D) 10^{-5}
70. Which of the following contains the least percentage of carbon?
(A) Pig iron (B) Wrought iron
(C) Cast iron (D) Malleable iron
71. The material used for coating the welding electrode is termed as :
(A) Flux (B) Slag
(C) Protective layer (D) Binder
72. Chlorine acts as a bleaching agent only in the presence of :
(A) Dry air (B) Pure oxygen
(C) Moisture (D) Sun light
73. Which is the only metal that exist in liquid state at room temperature?
(A) Sodium (B) Lithium
(C) Strontium (D) Mercury
74. The refrigerant Freon-12 is chemically :
(A) CCl_2F_2 (B) CCl_3F
(C) CClF_3 (D) CCl_4F
75. Heat flux is the time rate of heat transfer per unit :
(A) Length (B) Volume
(C) Area (D) None of these
76. The most efficient cooling tower out of the following is :
(A) Atmospheric (B) Forced draft
(C) Natural draft (D) Induced draft

77. Milk is dried usually in a _____ dryer.
- (A) Freeze (B) Spray
(C) Tray (D) Rotary
78. Diaphragm pumps are used to transport :
- (A) Solids (B) Liquids
(C) Fluids (D) Slurries
79. Cavitation in a centrifugal pump can be avoided by keeping the :
- (A) Inlet pressure high (B) Outlet pressure low
(C) Inlet pressure low (D) Outlet pressure high
80. An oil is converted into fat by its :
- (A) Hydrolysis (B) Hydrocracking
(C) Hydration (D) Hydrogenation
81. The present Chairperson of UPSC :
- (A) Rajani Razdan (B) Sujata Singh
(C) Smriti Irani (D) Nirupama Rao
82. The crops which are sown in the rainy season?
- (A) Rabi crops (B) Zaid crops
(C) Kharif crops (D) All the above
83. "Bharatipura", authored by :
- (A) Chetan Shagat (B) U.R. Ananthamurthy
(C) Mulk Raj Anand (D) Arundhati Roy
84. In which place the Black soil can be seen?
- (A) Kuttanad (B) Idukki
(C) Nilambur (D) Chittoor
85. The members of Rajyasabha are elected for :
- (A) Five years (B) Six years
(C) Four years (D) Seven years

86. The world 's largest indoor stadium has been opened in which country :
- (A) Hungry (B) Canada
(C) Philippines (D) Germany
87. World Ozone Day observed on :
- (A) 16 September (B) 21 February
(C) 22 March (D) 23 March
88. The chairman of the governing body of Kudumbasree mission :
- (A) Director of Panchayath (B) Minister of LSG
(C) Principal secretary LSGD (D) Chief secretary
89. Name inaugural train that runs between Katra-Udhampur (25km) rail line in Jammu and Kashmir :
- (A) Vijay Express (B) Vivek Express
(C) Dal Express (D) Shree Shakti Express
90. Dongas are a particular type of house can be seen at :
- (A) Jaipur (B) Shimla
(C) Ranchi (D) Kashmir
91. The first temple police station situated in Kerala :
- (A) Sabarimala (B) Padmanabhaswami temple
(C) Guruvayoor (D) Chottanikkara
92. Venganoor is the birth place of :
- (A) Sree Narayana Guru (B) Ayyankali
(C) Chattambi Swamikal (D) Thycadu Ayyaguru

93. In which portrait was depicted in Indian 500 rupee?
(A) Himalaya
(B) Dandi march
(C) Indian Parliament
(D) Development of Indian science and technology
94. The Kesari, the newspaper published by :
(A) Mrs. Annie Besant
(B) G.K. Gokhale
(C) Swami Vivekananda
(D) B.G. Tilak
95. Prathyaksha Raksha Daiva Sabha [PRDS] was founded by :
(A) Ayyankali
(B) Arattupuzha Velayudha panikar
(C) Poikayil Kumara Gurudevan
(D) Kandan Kumaran
96. The volunteer captain of the Guruvayoor Satyagraha was :
(A) T.K. Madhavan
(B) A.K. Gopalan
(C) K. Kelappan
(D) K.P. Kesava Menon
97. The Civil Disobedience Movement was started by Gandhiji on :
(A) 30 December 1929
(B) 10 April 1931
(C) 12 March 1930
(D) 20 April 1931
98. Self Employment provided to the educated youth in India through :
(A) SAY
(B) NEWP
(C) IAY
(D) PMRY
99. The Lahore Declaration in February 1999 was signed by :
(A) Vajpai-Nawas Sheriff
(B) Musharf-Manmohan Singh
(C) Manmohan Singh -Nawas Sheriff
(D) Vajpai-Musharf
100. Who was the father of immunology?
(A) Griger Mendal
(B) Hippocrates
(C) Edward Jenner
(D) Charles Darwin