130. Varnish does not contain

(1) pigment (2) thinner

(3) dryer (4) anti skinning agent

131. Catalyst used in oxidation of ammonia is

(1) Platinum-Beryllium (2) Platinum-Rhodium

(3) Cobalt-Molybdenum (4) Platinum-Molybdenum

132. Fluids which show an apparent increase in viscosity with time are called

(1) rheopectic (2) thixotropic (3) ideal fluids (4) newtonian fluids

133. Bernoulli's theorem deals with the law of conservation of

(1) energy (2) mass

(3) momentum (4) gravity

134. Pitot tube is used to measure

(1) local velocity at a point (2) volumetric flow rate

(3) average velocity (4) pressure at a point

135. Stoke (St) is the unit of kinematic viscosity and one stoke is equal to

(1) $1 m^2/s$ (2) $1 ft^2/s$ (3) $1 cm^2/s$ (4) $1 mm^2/s$

136. For laminar flow in a pipe, the value of kinetic energy correction factor (α) is

(1) 1 (2) 1.01 (3) 1.33 (4) 2

137. Which of the following equations is applicable for the flow of fluid through packed bed?

(1) Hagen-Poiseuille equation (2) Kremser equation

(3) Nikuradse equation (4) Ergun equation

138. Which of the following pumps is preferred for pumping slurries?
(1) Gear pump (2) Lobe pump
(3) Screw pump (4) Centrifugal pump

139. Minimum porosity for fluidization is
(1) that corresponding to static bed
(2) that corresponding to completely fluidized bed
(3) the porosity of the bed when true fluidization begins
(4) less than that of the static bed

140. For turbulent flow in smooth pipe of diameter D, the transition length is taken as
(1) 0.05 D (2) 50 D (3) 150 D (4) 0.5 D

141. Which one of the four factors would cause heat transfer rate by conduction to decrease, if the value of that factor were increased?
(1) temperature difference (2) thermal conductivity
(3) area (4) thickness

142. Thermal conductivity is minimum for
(1) asphalt (2) water
(3) petroleum coke (4) air

143. In forced convection, fluid moves under the influence of
(1) changes in fluid pressure produced by external work
(2) buoyant forces arising from changes in density
(3) elastic forces
(4) surface tension forces

144. The Graetz number is associated with
(1) heat transfer by radiation (2) heat transfer in laminar flow
(3) heat transfer in turbulent flow (4) mass transfer operations

145. Drop-wise condensation usually occurs on
(1) smooth surface (2) oily surface
(3) coated surface (4) glazed surface

146. The presence of small amounts of non-condensing gas in a condensing vapor
(1) greatly increases the rate of condensation
(2) seriously reduces the rate of condensation
(3) does not affect the rate of condensation
(4) increases the condensing film coefficient

147. The heat flux in the free convection regime of pool boiling varies as the
(1) ΔT^3 (2) $\Delta T^{5/4}$ (3) ΔT^2 (4) $\Delta T^{1/4}$

148. In a single effect evaporation, to evaporate 1 lb of water from a solution calls for
(1) 1 to 1.3lb of steam (2) 1.5 to 2 lb steam
(3) 2 to 2.5 lb of steam (4) 0.5 to 0.8 lb of steam

149. The total emissivity of a real surface is
(1) less than zero (2) greater than one
(3) equal to one (4) greater than zero but less than one

150. The units of fouling factor are
(1) $m^2.K/W$ (2) $W/(m^2.K)$ (3) m.K/W (4) m^2K^4/W

151. Crushing efficiency of a size reduction equipment ranges between
(1) 0.1 to 2% (2) 10 to 20% (3) 40 to 50% (4) 70 to 80%

152. Which of the following screens has the maximum capacity?
(1) Grizzlies (2) Trommels
(3) Vibrating screen (4) Stationery screen

153. In a ball mill most of the reductin is done by
(1) slow compression (2) cutting
(3) attrition (4) impact

154. In a rotary-drum filter, the fractional submergence of the drum in the slurry is about
(1) 0.03 (2) 0.30 (3) 0.90 (4) 0.15

155. Industrially, the process of sedimentation is conducted on a large scale in equipment called
(1) sorting classifiers (2) cyclones
(3) thickeners (4) filters

156. The speed, in rpm, of a continuous rotary vacuum filter may be
(1) 1 (2) 100 (3) 1000 (4) 10000

157. Froth flotation is most suitable for treating
(1) iron ores (2) sulphide ores
(3) quartzite (4) nitride ores

158. The most efficient equipment for removal of sub-micron dust particles form blast furnace gas is
(1) venturi scrubber (2) gravity settling chamber
(3) electrostatic precipitator (4) cyclone separator

159. Change of state, e.g. freezing, melting, evaporation and condensation, is an
(1) adiabatic process (2) isobaric process
(3) isothermal process (4) isochoric process

160. Mathematical statement of second law of thermodynamics is
(1) $\Delta S = 0$ (2) $\Delta S > 0$ (3) $\Delta S < 0$ (4) $\Delta S \geq 0$

161. The variation of heat of reaction with temperature at constant pressure or at constant volume is known as

(1) Kirchoff's law (2) Fourier's law (3) Laplace law (4) Hess's law

162. The principal of refrigeration is based on

(1) Zeroth law of thermodynamics (2) first law of thermodynamics
(3) second law of thermodynamics (4) thrid law of thermodynamics

163. A gas is termed an ideal gas if it obeys the gas equation PV = RT. When do you expect a gas to show deviation from ideality?

(1) At high pressures and low temperatures
(2) At low pressures and low temperatures
(3) At high pressures and high temperatures
(4) At low pressures and high temperatures

164. From Arrhenius law a plot ln k versus 1/T gives a straight line with a slope of (-E/R). The units of E/R are

(1) K (2) cal (3) cal/K (4) K/cal

165. The rate constant of any reaction depends on

(1) the temperature of the system (2) the time of reaction
(3) the extent of reaction (4) the initial concentration of the reactants

166. A catalyst is a substance which

(1) increases the equilibrium concentration of the product
(2) changes the equilibrium constant of the reaction
(3) shortens the time to reach equilibrium
(4) supplies energy to the reaction

167. If the time required to change the concentration of reactant to half its original value is independent of the initial concentration, the order of the reaction is

(1) zero (2) one (3) two (4) three

168. The irreversible reaction is simply the special case of the reversible reaction if

(1) the concentration of the reactant at equilibrium conditions is zero

(2) the fractional conversion of the reactant at equilibrium conditions is zero

(3) the equilibrium constant is zero

(4) the equilibrium constant is one

169. The steady state temperature reached by a small amount of liquid evaporating into a large amount of unsaturated vapor-gas mixture is called

(1) dry-bulb temperature

(2) dew point

(3) wet-bulb temperature

(4) bubble point

170. Relative volatility, α, for a binary system

(1) decreases with increase in pressure

(2) increases with increase in pressure

(3) increases with increase in temperature at constant pressure

(4) has no significance in distillation operation

171. At minium reflux ratio the operating cost of a distillation column is

(1) maximum (2) optimum (3) minimum (4) infinite

172. For all useful liquid-liquid extraction operations the selectivity of solvent must be

(1) more than zero (2) more than one

(3) less than one (4) less than or equal to one

173. At fixed temperature, the solubility of gases in solvent
(1) remains constant with change in pressure
(2) decreases with increase in pressure
(3) increases with increase in pressure
(4) decreases exponentially with increase in pressure

174. Vegetable oils are recovered from oil seeds by leaching with
(1) hot sulphuric acid (2) cold water
(3) nitric acid (4) hexane

175. The ratio of momentum diffusivity to mass diffusivity is known as
(1) Schmidt number (2) Sherwood number
(3) Lewis number (4) Stanton number

176. Which one of the cooling tower is most efficient?
(1) Chimney type natural draft cooling tower
(2) Atmospheric circulation type cooling tower
(3) Induced draft cooling tower.
(4) Forced draft cooling tower

177. Granular or crystalline material can be dried in
(1) tray dryer (2) rotary dryer
(3) screen-conveyor dryer (4) screw-conveyor dryer

178. Swenson-Walker crystallizer is a
(1) continuous unit (2) batch unit
(3) semi-batch unit (4) cooling (adiabatic)-cum-evaporation device

179. Which one of the following is a static characteristic of instruments?
(1) Fidelity (2) Time lag (3) Dynamic error (4) Reproducibility

180. Which of the following is most suitable to measure a temperature of 2000°C?
(1) Ordinary mercury-in-glass thermometer
(2) Platinum resistance thermometer
(3) Radiation pyrometer
(4) Constant-volume hydrogen thermometer

181. Offset is zero for
(1) P-controller only
(2) P-D controller only
(3) P- and P-D controllers
(4) P-I and P-I-D controllers only

182. On-off control is a special case of
(1) proportional control
(2) proportional-integral control
(3) proportional-derivative control
(4) proportional-integral-derivative control

183. Absolute pressure is measured by
(1) a bourdon gauge
(2) an aneroid barometer
(3) a differential manometer
(4) a vacuum gauge

184. Response of a linear control system for a change in set point is called
(1) frequency response
(2) transient response
(3) servo problem
(4) regulator problem

185. Degree to which an instrument indicates the changes in measured variable withou dynamic error is called
(1) speed of response
(2) reproducibility of instrument
(3) fidelity
(4) its static characteristics

186. Step response of a first-order system is
(1) under damped
(2) critically damped
(3) over damped
(4) undamped

187. Solar radiation flux is often reported in Langleys per year. The unit of Langley is equal to
(1) 1 cal/cm^2 (2) 1 Btu/ft^2 (3) 1 j/m^2 (4) 1 Btu/in^2

188. Conversion efficiencies for silicon cells (i.e., solar cells) range between
(1) 10 and 15% (2) 30 and 35%
(3) 90 and 95% (4) 95% and 99%

189. The function of a windmill is to extract energy from the wind and to produce
(1) mechanical energy (2) thermal energy
(3) electrical energy (4) chemical energy

190. The maximum power available in the wind is directly proportional to the velocity of the wind raised to the power
(1) 1 (2) 2 (3) 3 (4) 4

191. Liquefied petroleum gas (LPG) is a
(1) primary liquid fuel (2) primary gaseous fuel
(3) secondary gaseous fuel (4) secondary liquid fuel

192. Which of the following isotope is a raw material for the production of Pu^{239} nuclear fuel?
(1) U^{238} (2) U^{235} (3) U^{233} (4) U^{234}

193. The quality of a good fuel is
(1) high calorific (2) low cost
(3) easily available (4) no ash

194. Which one of the following is the most severe air pollutant?
(1) SO_2 (2) NO_X (3) CO (4) CH_4

195. Thermal power plants are the major source of

(1) SO_2 pollutants (2) ammonia pollutants

(3) NO_X pollutants (4) phosgene pollutants

196. The fire of electrical equipments can be extinguished with the use of

(1) soda-acid extinguisher (2) carbon dioxide extinguisher

(3) foam extinguisher (4) antifreeze extinguisher

197. Fire is a proper combination of

(1) fuel and oxidizing material (2) fuel and oxygen

(3) fuel, oxygen and temperature (4) oxidizing material and air

198. Well ventilated wooden shed can be used to store

(1) oxidizing materials (2) flammable liquids

(3) acids (4) compressed gases

199. The biochemical treatment of sewage effluents is essentially a process of

(1) reduction (2) oxidation

(3) dehydration (4) alkalinization

200. Which one of the following chemical is present in the form of inorganic impurity in water pollution?

(1) Proteins (2) Fats (3) Salts of metals (4) Carbohydrates