QUESTION PAPER 2012

101. Stress strain curve is always a straight line for
   (a) Elastic materials
   (b) Materials obeying Hook's law
   (c) Elasto-plastic materials
   (d) Plastic materials

102. The maximum value of poisson's for an elastic material is
   (a) 0.25 (b) 0.5
   (c) 0.75 (d) 1.0

103. The stress at which extension of a material takes place more quickly as compared to the increase in load is called
   (a) Elastic point
   (b) Plastic point
   (c) Breaking point
   (d) Yielding point

104. For ductile materials, the most appropriate failure theory is
   (a) Maximum shear stress theory
   (b) Maximum principal stress theory
   (c) Maximum principal strain theory
   (d) Shear strain energy theory

105. The materials which have the same elastic properties is in all directions are
   (a) Brittle material
   (b) Homogeneous material
   (c) Isotropic material
   (d) Hard material

106. An elastic bar of length 'l', cross sectional area A, Young's modulus of elasticity E and self weight W is having vertically, it is subjected to load applied axially at the bottom end. The total elongation of the bar is given by
   (a) WI/AE + PI/AE
   (b) WI/2AE + PI/AE
   (c) WI/2AE + PI/2AE
   (d) WI/AE + PL/2AE

107. The bending moment diagram is a cubic parabola for a cantilever
   (a) Subjected to traingular load varying from zero at free end to maximum at fixed end
   (b) With free and subjected to a moment
   (c) Subjected to uniformly distributed load
   (d) Subjected to concentrated load at the free end

108. For a simply supported beam with central load, the bending moment will be
   (a) Least at the centre
   (b) Least at the supports
   (c) Maximum at the supports
   (d) Maximum at the centre

109. The B.M on a section is maximum when shearing force
   (a) Is maximum
   (b) Is minimum
   (c) Is equal
   (d) Changes sign

110. The deflection due to couple M at the free end of a cantilever of length L is

(a) ML/EI (b) 2ML/EI

(c) $ML^2/2EL$ (d) $M^2L/2EI$

111. The shear force on a simply supported beam is proportional to

(a) Displacement of the neutral axis

(b) Sum of the forces

(c) Algebraic sum of traverse forces

(d) Algebraic sum of axial forces

112. The shape of the bending moment diagram over the length of a beam, having no external load is always.

(a) Parabolic (b) Cubical

(c) Linear (d) Circular

113. The ratio of maximum to average shear stress in a solid circular section is

(a) 1.0 (b) 1.33

(c) 1.5 (d) 1.7

114. The poison's ratio for cork is

(a) zero (b) 0.1

(c) 0.2 (d) 0.3

115. The sum of the moment of inertias about any two orthogonal axes is

(a) Always constant

(b) Always zero

(c) Always one

(d) Always linear

116. Strain energy in torsion of a shaft per unit volume is given by considering 'q' as shear stress, E modulus of elasticity and G as modulus of rigidity

(a) $q^2/2G$ (b) $q^2/2E$

(c) $q/4G$ (d) $q/4E$

117. The maximum shear stress in a thin tube is

(a) Equal to average shear stress

(b) Twice the average shear stress

(c) Half the average shear stress

(d) One third average shear stress

118. Macaulay's method is used for calculation of which quantity

(a) Bending moment

(b) Shear force

(c) Slope and deflection

(d) Stresses

119. Along the neutral axis of simply supported beam.

(a) Fibers do not undergo strain

(b) Fibers undergo minimum strain

(c) Fibers undergo maximum strain

(d) Fibers undergo minimum stress

120. The area under stress strain curve represents

(a) Workdone (b) Ductility

(c) Strain energy

(d) Residual stress

121. The maximum deflection of a cantilever beam due to pure bending moment (M) at its free end is

(a) $MI^2/3EI$ (b) $MI^2/4EI$

(c) $MI^2/6EI$ (d) $M^2/2EI$

122. The shape of kern area of a rectangular section is

(a) Rectangle (b) Square

(c) Rhombus

(d) Parallelogram

123. Polar modulus of a section of strength of section in

(a) Bending (b) Shear

(c) Torsion

(d) Axial compression

124. Thick cylinders are analysed on the basis of

(a) Maximum shear stress theory

(b) Lame's theory

(c) Poisson's theory

(d) Rankine's theory

125. When one end of a fixed beam deflects by 'δ' then the bending moment at deflected end is

(a) $\frac{2EI\delta}{L^2}$ (b) $\frac{3EI\delta}{L}$

(c) $\frac{3EI\delta}{L^2}$ (d) $\frac{6EI\delta}{L^2}$

126. The flexural rigidity of a hinged end is

(a) Infinity (b) Zero

(c) Two (d) One

127. Buckling load can be greater than crushing load if

(a) Column is a short column

(b) Column has both ends fixed

(c) Column is a long one

(d) Column both ends hinged

128. For a column of length 'L' having one end fixed and other end free, the equivalent length is

(a) 2L (b) L

(c) L/2 (d) $L/\sqrt{2}$

129. The ratio of crippling loads of a column having both the ends fixed and the column whose both the ends are hinged, is

(a) 1.0 (b) 2.0

(c) 3.0 (d) 4.0

130. The maximum height of a masonry dam of a triangular section whose base width is 'b' and specific gravity 's' is

(a) $b\sqrt{s}$ (b) b.s

(c) $\sqrt{b}\ \sqrt{s}$ (d) $s\sqrt{b}$

131. The failure wedge develops when a retaining wall

(a) Moves away from the backfill

(b) Moves towards backfill

(c) Sink downwards

(d) Stresses equally by vertical and horizontal forces

132. The lateral earth pressure on a retaining wall

(a) Is equal to mass of the soil retained

(b) Proportional to the depth of the soil

(c) Proportional to the square of the depth of the soil

(d) Proportional to the internal friction of the soil

133. Modulus of rapture of concrete is a measure of

(a) Flexural tensile strength

(b) Direct tensile strength

(c) Compressive strength

(d) Both flexural & tensile strength

134. The fineness modulus of fine aggregate is in the range of
(a) 2.0 to 3.5 (b) 3.5 to 5.0
(c) 5.0 to 7.0 (d) 7.0 to10.0

135. For making a good concrete, aggregate should be in
(a) Saturated condition
(b) Surface dry condition
(c) Bone dry condition
(d) Semi saturated condition

136. For reinforced cement concrete the slump should be
(a) 0 to 5 cm
(b) 2.5 to 7.5 cm
(c) 7.5 to 10 cm
(d) 5 to 12.5 cm

137. The ratio of tensile to compressive strength of concrete is
(a) 0.025 (b) 0.04
(c) 0.1 (d) 0.4

138. Design mix concrete is preferred over nominal mix concrete because
(a) Strength of former is more
(b) Cement content of later is more
(c) It is easy to prepare former at site
(d) Strength of later is less

139. Which of the following does not cause unsoundness is cement
(a) Free lime
(b) Magnesia
(c) Calcium Sulphate
(d) Silica

140. The partial safety factor for steel as per IS 456-2000 is taken as
(a) 1.15 (b) 1.25
(c) 1.50 (d) 1.75

141. In working stress design, the factor of safety is applied on
(a) Ultimate Stress
(b) Yield stress
(c) Stress at elastic limit
(d) Breaking stress

142. In a RCC column if ties are not provided, the column is likely to
(a) Fail by buckling
(b) Fail by crushing
(c) Behave like a beam
(d) Fail by torsion

143. To design a column, one should normally start by assuming the area of steel as
(a) 1% (b) 0.15%
(c) 0.5% (d) 0.75

144. Which of the following is generally not designed for shear
(a) A slab
(b) A cantilever beam
(c) A footing
(d) A beam

145. The maximum shear stress in a beam of rectangular section is given by
(a) 1.25 times the average
(b) 1.5 times the average
(c) 1.75 times the average
(d) 2.0 times the average

146. The radius of a bar bend to form a hook, should not be less than

(a) Twice the diameter

(b) Thrice the diameter

(c) Four times the diameter

(d) Five times the diameter

147. Increase in fineness modulus of aggregate indicates

(a) Fine grading

(b) Coarser grading

(c) Gap grading

(d) Mixed grading

148. In slab, the minimum reinforcement provided is (for Fe 250 grade)

(a) 0.10% of its gross sectional area

(b) 0.12% of its gross sectional area

(c) 0.15% of its gross sectional area

(d) 0.18% of its gross sectional area

149. The diameter of longitudinal bars of a column should never be less than

(a) 6mm (b) 8 mm

(c) 10mm (d) 12mm

150. A column is regarded as long column if the ratio of its effective length and lateral dimension exceeds

(a) 10 (b) 12

(c) 20 (d) 25

151. The shear reinforcement in RCC is provided to resist

(a) Vertical shear

(b) Horizontal shear

(c) Diagonal compression

(d) Diagonal tension

152. The maximum ratio of span to depth of a slab simple supported and spanning in two direction, is

(a) 25 (b) 30

(c) 35 (d) 40

153. If concrete grade is M-20 then what would be the modular ratio

(a) 7.08 (b) 9.08

(c) 12 (d) 13.33

154. For stairs spanning horizontally the minimum waist provided is

(a) 4 cm (b) 6 cm

(c) 10 cm (d) 12 cm

155. If T and R are tread and rise respectively of a stair, then

(a) $2R + T = 60$

(b) $R + 2T = 60$

(c) $2R + T = 30$

(d) $R + 2T = 30$

156. Invar tape is made of an alloy of ..... and steel.

(a) Copper (b) Zinc

(c) Nickel (d) Bronze

157. Walking over the area and observing its main features and boundaries, is known as .....survey.

(a) Topographical

(b) Cadastral

(c) City

(d) Reconnaissance

158. The sum of the exterior angles of a closed traverse is equal to ..... Right angles, where n is the number of its sides

(a) (2n-4) (b) (2n+4)

(c) (4n-2) (d) (4n+2)

159. If the whole circle bearing of a line is 270°, then its bearing in quadrantal system is

(a) 90° W (b) 90° E

(c) 180° W (d) 180° E

160. A line which passes through the optical centre of the objective and also through the intersection of the cross hair, is called .....

(a) Line of collimation

(b) Axis of telescope

(c) Horizontal axis

(d) Trunnion axis

161. If R.L of a B.M is 200.00 m, back sight is 1.525 m and foresight is 3.285 m, R.L of the forward station, is .....

(a) 198.460 m (b) 201.760m

(c) 198.240m (d) 201.525m

162. In trapezoidal formula of areas, the line joining the ends of the ordinates is assumed .....

(a) Semi circular (b) Straight

(c) Parabolic (d) Circular

163. 1 acre is equal to

(a) 43560 sq.ft (b) 34560 sqft

(c) 54360 sq.ft (d) 64350 sqft

164. If a tacheometer is fitted with analiatic lens

(a) Additive constant is 100, multiplying constant is 0

(b) Additive constant is 0, multiplying constant is 100

(c) Both additive constant and multiplying constant are 100

(d) Both additive constant multiplying constant are 50

165. One S.I unit of viscosity is equal to

(a) 10 poises (b) 981 poises

(c) 9.81 Ns/m^2 (d) $kg.sec/m^2$

166. 8m of oil (sp. Gr. = 0.8) head is equal to the following water head

(a) 10 m

(b) 8 m

(c) 6.4 m

(d) 1 m

167. A vertical triangular area of altitude h has one side in the free surface of a liquid. Its vertex is downward. The depth of its centre of pressure is

(a) 0.8 h (b) 0.75 h

(c) 0.5 h (d) h/3

168. The equation of continuity

(a) Is valid for incompressible fluids

(b) Expresses the relation between mass and are of cross-section

(c) Relates the density variations along a stream line

(d) Relates the mass rate of flow along a stream tube

169. Flow of a fluid from low pressure to high pressure is
(a) Possible in upward flow through a uniform vertical line
(b) Possible in flow through a converging pipe with horizontal axis
(c) Possible in flow through a diverging pipe with a horizontal axis
(d) Impossible if the passage has a constant cross- section

170. Differential manometers are used for measuring
(a) Velocity of fluid at a point
(b) Pressure of fluid at a point
(c) Discharge of fluid
(d) Difference of pressure between two points

171. The length of staircase between the landings is called
(a) rise
(b) tread
(c) flight
(d) effective length

172. A V-notch is considered to be a better notch because
(a) Its C_d is practically uniform over a wide range of heads
(b) It produces negligible contraction of the nappe
(c) It keeps the head within a reasonable limit even for large discharges
(d) Its C_d is smaller

173. An error of 1 mm is committed in the measurement of head over a rectangular notch. If the head is 0.3m the percent error in discharge is
(a) 0.5
(b) 0.6
(c) 1.0
(d) 1.5

174. The Hagen-Poiseuille equation gives
(a) Head loss in liminar flow
(b) Boundary shear stress in laminar flow
(c) Shear stress distribution in any pipe flow
(d) Velocity distribution in any pipe flow

175. The loss of head due to friction in turbulent flow through a circular pipe
(a) Varies cube of average velocity
(b) Varies inversely as square of average velocity
(c) Varies as square of average velocity
(d) Is directly proportional to average velocity

176. Laminar flow through a pipe, the velocity distribution curve is
(a) Logarithmic (b) Parabolic
(c) Elliptical (d) Hyperbolic

177. For the most economical trapezoidal section of an open channel
(a) Depth of flow = twice base width
(b) Depth of flow = Hydraulic radius

(c) Sloping side = half the top width

(d) Sloping side = base width

178. Froude's number is defined as the ratio of

(a) Inertia force to viscous force

(b) Inertia force to elastic force

(c) Inertia force to pressure force

(d) Inertia force to gravity force

179. The critical velocity for a flow of qm^3 width of a wide rectangular channel is given by

(a) $\left(\frac{q^2}{g}\right)^{1/3}$ (b) $(q^2g)^{1/3}$

(c) $\left(\frac{g}{q^2}\right)^{1/3}$ (d) $(qg)^{1/2}$

180. The function of scroll case of a reaction turbine is to

(a) Guide the water to the runner at appropriate angle

(b) Guide the water smoothly to the tailrace

(c) Distribute the water evenly around the wheel

(d) Reduce the eddy and shock losses

181. The runner blades of a kaplan turbine are

(a) More curved than propeller blades

(b) More curved than pelton blades

(c) More curved than francis blades

(d) Less curved than francis blades

182. When the speed of a centrifugal pump is constant

(a) Shaft power decreases with increase of Q

(b) Hm decreases with increase of Q

(c) Q increase with increase of H_m

(d) Q is independent of H_m

183. The optical square is based on the principle of optical

(a) Reflection

(b) Refraction

(c) Double reflection

(d) Double refraction

184. A reservoir provided at the intake head works from which water enters the penstock is

(a) Power canal (b) Tail rack

(c) Fore bay (d) Trash rack

185. Consumptive use is

(a) Water used up in plant metabolism

(b) Sum of evapo-transpiration and amount used up in plant metabolism

(c) Sum of evapo-transpiration and infiltration losses

(d) Combined use of surface and ground water resources

186. The head under which a centrifugal pump works is called

(a) Piezometric head

(b) Pressure head

(c) Suction head

(d) Manometric head

187. The volume of water that can be extracted by force of gravity from a unit volume of aquifer material is known as

(a) Specific capacity

(b) Specific yield

(c) Specific retention

(d) Specific storage

188. One cumec day is equal to

(a) 8.64 hectare metres

(b) 86.4 hectare metres

(c) 864 hectare metres

(d) 0.864 hectare meters

189. Lacey considered channel section

(a) Rectangular

(b) Trapezoidal

(c) Semi elliptical

(d) Elliptical

190. Land is said to be water logged when

(a) Gravity drainage is ceased

(b) Permanent wilting point is reached

(c) Slinity of soil increases

(d) Capillary fringe reaches root zone of plants

191. Hydraulic jump occurs when the flow changes from

(a) Super critical to sub critical

(b) Sub critical to super critical

(c) Critical to turbulent

(d) Laminar to turbulent

192. Streams that contribute to the ground water are called

(a) Effluent streams

(b) Ground water stream

(c) Influent streams

(d) Perennial stream

193. Rational method correlates

(a) Run off coefficient with intensity of rainfall

(b) Run off co efficient with drainage area

(c) Drainage area with intensity of rainfall

(d) Intensity of rainfall with run off

194. The example of multiple Arch type buttress dam in India is

(a) Mir-Alam dam

(b) Khadakwasla dam

(c) Iddikki dam

(d) Koyna dam

195. Surcharges storage of reservoir is the volume of water stored between

(a) Normal pool level and maximum pool level

(b) Maximum pool level & minimum pool level

(c) Minimum pool level and normal poor level

(d) Normal pool level and revert bed level

196. Seepage endangers the stability of an earth dam built on previous foundation because of piping which depends on

(a) Height of dam

(b) Quantity of seepage flow

(c) Value of exit gradient

(d) Total reservoir storage capacity

197. Inverted filter for providing foundation drainage has

(a) Multi layers of soil particles of same permeability

(b) Multi layers in which permeability increase from top to bottom

(c) Multi layers in which permeability increases from bottom to top

(d) Only one layer of soil

198. Gravity dams transfer load to foundation by

(a) Arch action

(b) Cantilever action

(c) Both arch and cantilever action

(d) Cohesion

199. A chute spill way is generally provided with

(a) A weir

(b) A barrage

(c) Concrete

(d) An earth dam

200. The function of surge tank is to

(a) Avoid flow in reverse direction

(b) Smoothen the flow

(c) Act as a reservoir for emergency condition

(d) Relieve the pipe line of excessive pressure transients.

ANSWERS

(101) **b**	(102) **b**	(103) **d**	(104) **a**	(105) **c**	(106) **b**	(107) **a**
(108) **d**	(109) **d**	(110) **c**	(111) **c**	(112) **c**	(113) **b**	(114) **a**
(115) **a**	(116) **a**	(117)	(118) **c**	(119) **a**	(120) **c**	(121) **d**
(122) **c**	(123) **c**	(124) **b**	(125) **d**	(126) **b**	(127) **c**	(128) **a**
(129) **d**	(130) **a**	(131) **a**	(132) **b**	(133) **a**	(134) **a**	(135) **a**
(136) **d**	(137) **c**	(138) **b**	(139) **d**	(140) **a**	(141) **b**	(142) **a**
(143) **c**	(144) **a**	(145) **b**	(146) **a**	(147) **b**	(148) **c**	(149) **d**
(150) **b**	(151) **a**	(152) **c**	(153) **d**	(154) **c**	(155) **a**	(156) **c**
(157) **d**	(158) **b**	(159) **a**	(160) **a**	(161) **c**	(162) **b**	(163) **a**
(164) **b**	(165) **a**	(166) **c**	(167) **c**	(168) **d**	(169) **c**	(170) **d**
(171) **c**	(172) **a**	(173) **a**	(174) **a**	(175) **c**	(176) **b**	(177) **c**
(178) **d**	(179) **a**	(180) **b**	(181) **a**	(182) **c**	(183) **c**	(184) **c**
(185) **b**	(186) **d**	(187) **a**	(188) **a**	(189) **c**	(190) **d**	(191) **a**
(192) **c**	(193) **a**	(194) **a**	(195) **a**	(196) **c**	(197) **b**	(198) **c**
(199) **d**	(200) **d**					