

**(The question bank contains the illustrative example of objective, short notes as well as essay type questions, but this is not exhaustive.)**

**QUESTION BANK FOR DRAWING**

**I. Choose the correct answer**

1. A bridge is generally designated as “Br. No. 180 (5x9.10m G) at km 345/5-6”. In the above designation, 9.10m refers to the
  - a) Effective Span
  - b) Width of bridge
  - c) **Clear Span**
  - d) Overall length of bridge
  
2. The strength of a bridge is termed as MBG loading of 1987. MBG refers to
  - a) Model Broad Gauge
  - b) Modified Budget Grant
  - c) Model Budget grant
  - d) **Modified Broad Gauge**
  
3. In a temporary signaling arrangements for a bridge work in BG section, caution board shall be placed in advance of ..... m from start of the bridge/ workspot.
  - a) 30 m
  - b) **1200 m**
  - c) 677 m
  - d) 1000 m
  
4. Free Board is the level difference between Formation Level and .....
  - a) Rail Level
  - b) **HFL**
  - c) Bed Level
  - d) Danger Level
  
5. Minimum Free Board required in a bridge is
  - a) **1 m**
  - b) 1.20 m
  - c) 600 mm
  - d) 300 mm
  
6. Vertical Clearance (VC) in water way bridges is the level difference between
  - a) HFL and Formation level
  - b) Bed level and bottom of superstructure
  - c) **HFL and bottom of superstructure**
  - d) Rail level and Formation level
  
7. When proposed depth of construction of a bridge is more than the existing depth of construction in a bridge work, the existing rail level requires
  - a) Lowering
  - b) **Lifting**
  - c) Slewing
  - d) None
  
8. Depth of construction in a girder bridge means the depth from
  - a) RL to HFL
  - b) **RL to top of bed block**
  - c) RL to bottom of bed block
  - d) RL to Bed level
  
9. Skew of a bridge is the angle between
  - a) C.L. of water course/road to C.L. of track
  - b) C.L. of pier to C.L. of abutment
  - c) **C.L. of water course/road to normal (perpendicular) of C.L. of track**

- d) C.L. of abutment to C.L. of pier
10. Angle of crossing of a bridge is the angle between  
 a) **C.L. of water course/road to C.L. of track**  
 b) C.L. of pier to C.L. of abutment  
 c) C.L. of water course/road to normal (perpendicular) of C.L. of track  
 d) C.L. of abutment to C.L. of pier
11. Square span of a bridge is 'x' and the skew angle is 'θ'. The skew span of the bridge is  
 a)  **$x / \cos \theta$**   
 b)  $x \tan \theta$   
 c)  $x \cos \theta$   
 d)  $x / \sin \theta$
12. In a single span bridge, the clear span is the distance between  
 a) Centres of Abutments  
 b) **Inner faces of Abutments**  
 c) Outer faces of Abutments  
 d) Width of Abutment
13. Sub structure of a bridge does not include  
 a) Abutment  
 b) **Girder/Slab**  
 c) Piers  
 d) Wing and Return walls
14. Super structure of a bridge includes  
 a) **Girder/Slab**  
 b) Abutment  
 c) Piers  
 d) Bed block
15. Bearings are provided in bridges to transfer the load to  
 a) Super structure  
 b) Track  
 c) Embankment  
 d) **Sub structure**
16. Wing walls and return walls are provided to retain  
 a) **earth on approaches**  
 b) ballast  
 c) track on approaches  
 d) none
17. The scale of the bridge General Arrangements Drawing (GAD) shall be  
 a) 1:10  
 b) 1:20  
 c) 1:1000  
 d) **1:100**
18. In a temporary signaling arrangements for a bridge work in BG section, speed board shall be placed in advance of 30 m from the  
 a) C.L. of the bridge  
 b) Termination Board  
 c) **Start of the bridge/workspot**  
 d) Caution Board
19. In deck type plate girders, the rail level shall be  
 a) **above the top of the girder**  
 b) near the bottom of the girder  
 c) near the middle of the girder  
 d) below the girder
20. An open web (truss type) girder is generally a  
 a) deck type girder  
 b) **through type girder**  
 c) semi-through type girder  
 d) plate girder
21. Pre tensioned PSC slabs are generally cast at



- a) 300 mm    b) 600 mm  
c) **0**     d) 1000 mm
34. The minimum horizontal clearance between face of pier/trestle columns to C.L. of straight track in machine working section is  
a) 1720 mm     b) **2575 mm**  
c) 2360 mm     d) 2135 mm
35. The minimum vertical clearance above R.L. to bottom of ROB near the yard shall be  
a) **6525 mm**    b) 5870 mm  
c) 2360 mm    d) 6250 mm
36. The width of carriage way for two lane traffic as per IRC is  
a) 3.60 m     b) **7.50 m**  
c) 8.00 m     d) 9.00 m
37. The approach gradient in ROB shall not normally be steeper than  
a) **1 in 30**     b) 1 in 33.33  
c) 1 in 20     d) 1 in 15
38. The minimum vertical clearance in RUB in rural area shall be  
a) 5870 mm     b) 6525 mm  
c) **5000 mm**     d) 5500 mm
39. The minimum vertical clearance in RUB in urban area shall be  
a) 5870 mm     b) 6525 mm  
c) 5000 mm     d) **5500 mm**
40. The trimmed size of A-1 drawing sheet is  
a) 1189 x 841 mm    b) 594 x 420 mm  
c) **841 x 594 mm**    d) 297 x 210 mm
41. The embankment width in approach of the bridge shall be  
a) 5870 mm     b) 6525 mm  
c) **6850 mm**     d) 6000 mm
42. The height gauge need to be provided in  
a) ROB     b) **LC in electrified section**  
c) FOB     d) Fly Over
43. The CRS sanction is required in the ROB project for construction of  
a) Approach spans    b) Laying road  
c) **Railway spans**    d) none
44. The minimum grade of concrete for RCC work in Railway shall be  
a) **M 25**     b) M 20  
c) 1:2:4 Nominal mix    d) M 15
45. In grade of concrete M 25, ‘M’ refers to





- (c) **0.04% per degree of curve.**  
 (d) None of the above.
69. The maximum sanctioned speed for a Group 'A' line is in .....kmph.  
 (a) **160 kmph.** (b) 80 kmph (c) 200 kmph. (d) None of the above.
70. The maximum sanctioned speed of a line is 130 kmph. This line is classified as  
 (a) Group A (b) Group C (c) **Group 'B'** (d) None of the above.
71. Madras Central-Gudur Section of Southern Railway is classified as  
 (a) Group C (b) Group E.Spl. (c) Group A Spl. (d) **Group A.**
72. The formation width in embankment for BG single line is.....m.  
 (a) **6.85** (b) 6.25 (c) 6.10 (d) 5.87.
73. The formation width in cutting for BG single line is  
 (a) 6.85 m (b) **6.25 m** (c) 6.10m (d) 5.87 m.
74. The tread of the wheels of a railway are sloped like a cone. The slop of this cone is  
 (a) **1 in 20** (b) 1 in 40, (c) 1 in 10 (d) 1 in 15.
75. The rails are tilted inwards at an angle of .....  
 (a) **1 in 20,** (b) 1 in 40, (c) 1 in 10 (d) 1 in 15.
76. The height of 60 kg. rail is .....  
 (a) 150mm (b) **172 mm,** (c) 156 mm (d) 136 mm.
77. The height of 52 kg. rail is  
 (a) 150 mm (b) 172 mm (c) **156 mm** (d) 136 mm.
78. The standard rail length for BG is  
 (a) 12 m (b) **13 m** (c) 6.5m (d) 11 m.
79. The sleeper density on MG is specified as M+4. The no. of sleepers per rail length is  
 (a) 12 (b) **16** (c) 17 (d) 20.
80. The height of the BG P.S.C. sleeper at rail seat is ..... mm.  
 (a) 235, (b) 180 (c) **210** (d) 270.
81. For L.W.R. track the requirement of ballast for 1 m length of track is .... Cum approx.  
 (a) 1.00 cum. (b) 1.50 cum. (c) 3.00 cum. (d) **2.15 cum.**
82. In turnouts, the crossings are designated as 1 in N where N is the ..... of angle of crossings.  
 (a) Tangent (b) sine. (c) cosine (d) **cotangent.**
83. The angle of crossing for 1 in 8 1/2 turnout is  
 (a) **6° 42' 45"** (b) 4° 45' 47" (c) 3° 34' 35"

84. Diamond crossings have ..... acute and ..... obtuse crossings.  
 (a) 1, 1      **(b) 2, 2**      (c) 1,2      (d) 4,4.
85. ....turnouts are used for snag dead ends.  
 (a) 1 in 12 turnouts (b) 1 in 12 sys.Splits. **(c) 1 in 8 1/2 Sy.splits.** (d) 1 in 16 turnouts.
86. The radius of lead curve for 1 in 12 turnouts is approximately.  
 (a)  $4^0$       (b)  $8^0$       (c)  $2^0$       (d)  $1^0$
87. The radius of lead curve for 1 in 8 1/2 turnouts is  
 (a)  $2^0$       (b)  $3^0$       **(c)  $8^0$**       (d)  $4^0$
88. The crossing angle in turnouts is generally denoted by  
 (a) N,      **(b) F**      (c) A      (d) B.
89. The crossing angle for 1 in 12 turnout is  
 (a)  $6^0 42' 45''$       **(b)  $4^0 45' 47''$**       (c)  $3^0 34' 35''$
90. A turnout is taking off from the outside of the curve. This is called as \_\_\_\_\_ turnout.  
**(a) Contra flexure,** (b) Similar flexure, (c) I.R.S. turnout, (d) None of the above.
91. A turnout is taking off from the inside of a curve. This is called as \_\_\_\_\_  
 (a) Contra flexure, **(b) Similar flexure,** (c) I.R.S. turnout (d) None of the above.
92. A 1 in 12 turnout in taking off from outside of a  $2^0$  curve. The resultant radius of the turnout curve is  
**(a)  $2^0$**       (b)  $4^0$       (c)  $1^0$       (d)  $8^0$
93. The switch angle of a turnout is generally denoted as  
 (a) A      **(b) B,**      (c) B,      (d) F.
94. A 1 in 16 turnout is taking off a  $2^0$  curve from inside of the curve. The resultant radius of the turnout curve is  
**(a)  $4^0$**       (b)  $8^0$       (c)  $6^0$       (d)  $0^0$
95. The gauge of track for BG at the fan shaped points and crossings is  
 (a) 1680 mm      (b) 1676 mm      **(c) 1673 mm**
96. The maximum permissible speed on a 1 in 12 turnout with curved switches is----- kmph.  
 a. 15      b. 20      **c. 30**      d. 50
97. Generally \_\_\_\_\_ turnouts are used for passenger loop lines.  
**(a) 1 in 12**      (b) 1 in 16      (c) 1 in 8 1/2
98. On I.R. the curve is defined by  
**(a) Radius**      (b) Radian,      (c) None of the above      (d) Either (a) or (b).



99. The radius of a 2 degree curve is \_\_\_\_\_.
- (a) **875 m**, (b) 1750 m (c) 583 m (d) 442 m.
100. For measuring the versine of a curve a \_\_\_\_\_ long chord is used.
- (a) 10 m, (b) **20m**, (c) 8m (d) 12m.
101. The difference in height between the outer and inner rails is known as
- (a) **Super elevation** (b) Cant excess (c) Either a or b (d) None.
102. Super elevation is provided on curved track mainly
- (a) **to neutralise the effect of lateral force.**  
 (b) To reduce the wear and tear of rails.  
 (c) To provide better comfort to passengers.  
 (d) None
103. The angle of deflection for a 4 degree curve is  $30^0$ . The length of circular curve is \_\_\_\_\_m.
- a. **229 m** b. 329m c. 429m d. none
104. The angle of deflection of a 4 degree curve is  $45^0$ . The tangent length for the circular curve is \_\_\_\_\_ m.
- a. 81m b. **181m** c. 281m d. none
105. The maximum cant that can be provided for a curve on A route is
- (a) **165 mm**, (b) 140 mm, (c) 185 mm, (d) 75 mm
106. The versine for a  $2^0$  curve measured on a 20 m chord is \_\_\_\_\_ mm.
- (a) 80 mm (b) 50 mm, (c) **57 mm**, (d) 10mm.
107. Maximum cant deficiency that can be permitted on BG is
- (a) 100mm, (b) **75mm** (c) 50 mm.
108. Maximum cant excess for BG is
- (a) 10 mm (b) 40 mm (c) **75 mm** (d) 50 mm.
109. The formula used for finding out S.E. on BG is  $\frac{GV^2}{127 R}$ . The value of G is
- (a) 1676 mm (b) 1000 mm, (c) **1750 mm.**
110. The desirable rate of change of cant or cant deficiency on BG is
- (a) **35 mm/sec**, (b) 55 mm/Sec, (c) 28 mm /sec.
111. Maximum cant gradient is \_\_\_\_\_
- (a) **1 in 720**, (b) 1 in 360, (c) 1 in 1000.
112. The type of transition curve used an I.R. is
- (a) **Cubic parabola**, (b) Spiral curve, (c) Sini curve.
113. Minimum radius of vertical curve on A route is .....m.
- (a) **4000 m** (b) 3000 m (c) 2500 m.

114. When the algebraic difference between the grades is equal to or more than ..... percent a vertical curve is provided.  
 (a) **0.4%** (b) 0.04 % (c) 4%.
115. The minimum length of straight between reserve curves on BG is ...m.  
 (a) **50 m** (b) 30 m (c) 20m.
116. The maximum degree of curve permitted on BG is.....  
 (a) 8 degree (b) **10 degree** (c) 16 degree.
117. The S.E. remains constant in the  
 (a) **Circular curve** (b) transition curve (c) spiral curve (d) all the above.
118. Degree of a railway curve is defined the angle subtended at the center of the curve by an arc of .....m.  
 (a) 10m. (b) 20 m (c) **30.5 m** (d) 40 m.
119. On a curve the transition length is 80 m and the superelevation is 160 mm. The cant gradient is  
 (a) 1 in 720 (b) 1 in 360 (c) **1 in 500.**
120. The length of transition curve is 100 m and the radius of the curve is  $1^0$ . The shift for the transition curve is  
 (a) **24cm.** (b) 12 cm. (c) 2 cm. (d) 100 cm.
121. A BG track has a  $3^0$  curve and a cant of 100mm is provided. The Max. permissible speed on the curve is  
 (a) **65 kmph.** (b) 100 kmph. (c) 130 kmph. (d) 110 kmph.
122. Cant deficiency occurs when the train travels on the curve at  
 (a) Speeds lower than the equilibrium speed.  
 (b) Equilibrium speed.  
 (c) Booked speed.  
 (d) **Speeds higher than the equilibrium speed.**
123. Cd provided on a curve is the difference of  
 (a) Actual cant and cant excessl  
 (b) Cant excess and cant actual  
 (c) Actual cant and cant for lower speed.  
 (d) **Cant for high speed and actual cant.**
124. Value of dynamic gauge used for calculating S.E. on BG is  
 (a) 1680 mm (b) **1750 mm** (c) 1050 mm (d) 1600mm.
125. The compensation for curvature on gradient for BG is given by the formula.  
 (a) 0.02 % (b) 0.03% (c) **0.04%** (d) none
126. A broad gauge 1 in 12 turnout takes off from the outside of a  $2^0$  curve. The S.E. on the main line will be equal to

- (a) 50 mm      **(b) 61 mm**      (c) 55mm      (d) 80 mm.
127. The actual cant provided for a BG 2<sup>0</sup> curved track is 100 mm. The cant required for a super fast train is 165 mm and for a goods train is 50mm. The cant deficiency is  
**(a) 65 mm**      (b) 50 mm      (c) 115 mm      (d) 150 mm.
128. If one L.H. curve is followed by a R.H.curve, the curve is called as  
 (a) Compound curve. (b) transition curve (c) spiral curve. **(d) Reverse curve.**
129. The max. permissible speed on a section is 130 kmph. Superelevation of 100 mm is provided over the curve taking cant deficiency as 75 mm what is the min. length of transition curve.  
 (a) 72m      (b) 78 m      **(c) 104 m**      (d) 144 m.
130. Rates for all items are inclusive of lift upto  
 a) 2.5m      b) 3.0m      c)2.0m      **d) 1.5m**
131. Maximum quantity of cement for one cubic metre of design mix of M25 grade of concrete for estimate purpose  
 a) 324kg      b) 372kg      **c) 425kg**      d) 422kg
132. max. Quantity of cement required for CM 1:6 mix is  
 a) 29.80 kg      **b) 28.30kg**      c) 27.3 kg      d) 28.7 kg
133. The rates in the schedule of rates do not include supply of the following for execution of works using this schedule  
 a) labour      b) vibrator      **c) water and electricity**
134. An annual passenger earning upto 50 crores category of stations come under  
 a) (A1)      **b) (A)**      c) (B)      d)(C)
135. Maximum quantity of cement for 1 cum of concrete of M15 grade  
 a) 342 kg      b) 325 kg      **c) 324 kg**      d) 326kg
136. B.W( Masonry with country brick) in CM of specified mix comes under SOR item  
 a) 602b      b) 602a      **c)602d**      d) 602c
137. Maximum quantity of cement for one cubic metre of brick work of CM 1:6 mix  
 a) 65 kg      b) 56kg      **c)60kg**      d) 62 kg
138. Rates for all items are inclusive of lead upto  
 a) 25m      **b) 30m**      c) 27.5m      d) 20m
139. RCC with 20mm graded stone aggregate for beams, cantilevers, and parapets comes under SOR item  
 a) **511b**      b) 511a      c) 511c,      d) 511d
140. RCC with 20mm for circular (or) parabolic arches comes under  
 a) 511 a,      **b) 511c**      c)511d      d)511b

141. Plastering with CM of specified mix over B.W of 12mm thick  
 a)1002b            b)1002c            **c)1002a**            d)1002d
142. For earth work the unit of rate is per  
 a) cum            **b) 10cum**            c) SQM            d) 10SQM
143. For painting, the unit of rate is per  
 a) Sqm            b) cum            **c) 10sqm**            d) 10cum
144. Minimum distance center to center of track for new works and alterations to existing works  
 a) 4725 mm            **b) 5300mm**            c) 5305mm            d) 5295mm
145. Formation width for single line straight track for minimum width in embankment  
 a) **6850mm**            b) 6855 mm            c) 7000 mm            d) 7100 mm
146. Formation width for double line straight track for minimum width in cutting (excluding side drain)  
 a) 11950mm            b) 11450 mm            **c) 11550 mm**            d)11650mm
147. Maximum clearance checkrail opposite nose of crossing  
 a) 47mm            b) 49mm            c) 50mm            **d) 48mm**
148. The equilibrium super elevation should be calculated by the formula  

$$C = \frac{GV^2}{127R}$$
 where C is in  
 a) m            b) cm            **c) mm**            d)km
149. Maximum gradient in station yards under special safety devices are adopted and / or special rules enforced to prevent accidents in accordance with approved special instructions for exg. Works  
 a)1 in 350            b) 1 in 300            **c) 1in 400**            d) 1 in 280.
150. Minimum height above rail level for a width of 1600 mm on either side of the center of track of the tie rods (or) any continuous covering in a passenger station.  
 a)6520mm            **b)6250mm**            c)6550mm            d)6750mm.
151. Minimum clear disatance for a height of 1830mm above rail level from center of track to any continuous structure in workshops  
**a)2745mm**            b)2475mm            c)2725mm            d)3725mm
152. Size of drawing sheets for general arrangements is  
**a.A1**            b.A0            c.A2            d.A3.
153. Size of drawing sheets for plans for inclusion in works progamme is  
 a.A2            b.A3            **c.A4**            d.A1
154. The lines on tracing & prints , the existing work that is to remain should be in  
**a) full line**            b) full dotted line            c) thin dotted line
155. Sand stone is  
**a) Sedimentary rock**            b) Metamorphic rock            c) Igneous rock            d) Volcanic rock
156. Graint Optioned from

- a) Sedimentary rock   b) Metamorphic rock   **c) Igneous rock**   d) from any other
157. A good building stone should not absorb water more than  
a) 20%                      b) 10%                      c) 15%                      **d) 5%**
158. The term frog means  
a) An apparatus to lift the stone   **b) a depression on a face of brick**  
c) Vertical joint in the brick (d) Bottom face of the brick
159. The minimum compressive strength of I class brick should be  
a) 75 kg/cm<sup>2</sup>                      b) 90 kg/cm<sup>2</sup>                      **c) 100 kg/cm<sup>2</sup>**                      d) 120 kg/cm<sup>2</sup>
160. Minimum crushing strength of the brick is  
a) 35 kg/cm<sup>2</sup>                      b) 65 kg/cm<sup>2</sup>                      **c) 70 kg/cm<sup>2</sup>**                      d) 105 kg/cm<sup>2</sup>
161. Normal size of brick used in India is  
a) 19cm x 12cm x 9cm   b) 25cm x 16cm x 8cm   **c) 22cm x 11.2cm x 7**   d) None of this
162. Sapwood consists of  
a) Inner most annular rings around the pith  
**b) Portion of timber between heartwood and cambium layers**  
c) Thin layers below the bark  
c) Thin fibers which extend from the pith outwards and hold the annular rings together
163. The moisture content in a well-seasoned timber is  
a) 4 to 6%                      **b) 10 to 12%**                      c) 15 to 20%                      d) 100%.
164. Number of bricks required for one cubic metre of brick masonry is  
a) 400                      b) 450                      **c) 500**                      d) 550
165. Main ingredients of Portland cement are  
**a) Lime and silica**   b) lime and alumina   c) silica and alumina   d) lime and iron
166. Initial setting time for ordinary Portland cement as per IS specifications should not be less than  
a) 10 min                      **b) 30 min**                      c) 60 min                      d) 100 min
167. Which of the following lime can set under water also  
a) fat lime                      b) lean lime                      **c) hydraulic lime**                      d) All the above
168. Seasoning of timber is necessary to  
a) Increase the fire resistance   b) Increase the vermin resistance  
c) Reduce the microbial substance   **d) Expel the moisture present in timber**
169. For foundation concrete the cement concrete mix should be of the following proportion  
a) 1:2:4,                      b) 1:3:6                      **c) 1:4:8**                      d) 1:5:10
170. The recommended slump for RCC beam using vibrator is about  
a) 2 to 3 cm                      b) 6 to 8 cm                      **c) 10 to 12.5 cm**                      d) 15 to 18 cm
171. Which cement should not be used for bridge slabs or RCC frames  
a) OPC                      **b) Portland Pozzolana cement**

- c) Portland furnace slag cement d) Rapid hardening cement
172. Standard bag of cement in ..... kg  
 a) 52 kg                      b) 30.5kg                      c) 10.7kg                      **d) 50 kg**
173. The concrete under water minimum grade of cement recommended by IS code  
 a) M 10                      b) M 15                      **c) M 20**                      d) M 25
174. What is DPC?  
 a) **Damp proof course**    b) weathering course  
 c) Treatment the foundation    d) Treatment over the roof
175. Brick below used in work must be soaked in water for a period of not less than  
 a) Full night              **b) 6 hours**              c) 10 hours              d) Non of the above
176. Brick work which to be plastered or pointed should be raked to a depth of  
 a) 10mm                      b) 15mm              **c) 20mm**                      d) 25mm
177. Expansion joint in masonry wall are provided in wall length greater than  
 a) 10m                      b) 20m                      c) 30m                      **d) 40m**
178. Minimum width of the staircase in residential building is  
 a) 55cm                      b) 70cm                      **c) 85cm**                      d) 120cm
179. For plastering the exposed brick walls the cement sand mortar should be  
 a) 1:2,                      b) 1:3                      **c) 1:4,**                      d) 1:6
180. The type of bond in a brick masonry containing alternative course of stretchers and headers is called  
 a) Flemish bond    b) stretcher bond    **c) English bond**    d) Header bond
181. The member, which support covering material of a sloped roof as  
 a) **Rafters**                      b) Purlins                      c) battens                      d) struts
182. The roof, which slopes in four directions, is called  
 a) Shed roof    b) gabbed roof    **c) hipped roof**    d) gabrel roof
183. Skew LC will have an angle of crossing between gate and road.  
 (a) 90 Deg.                      **(b) 90-45 Deg.**                      (c) 0 Deg.                      (d) 30-45 Deg.
184. Guard rails are not to be provided on  
 (a) Special class LC    (b) "A" class LC    (c) "C" class LC    **(d) Cattle crossing LC**
185. Minimum width of gate at right angle to the centre line of the track for class II route is  
 (a) 9 m or width of carriage way + 2.5 m whichever is more.  
**(b) 7.5 m or width of carriage way + 2 m whichever is more.**  
 (c) 5 m or width of carriage way + 2 m whichever is more.  
 (d) None of the above.
186. Minimum distance gate posts from centre line of track for any class of LC.  
 (a) 5 m                      (b) 6m.                      **(c) 3 m.**                      (d) 3.5 m.

187. Minimum number of Gate keeper for “A” Class LC is  
 (a) 3 (b) 1 (c) 4 (d) **2**
188. Minimum distance of Gate lodge from centre line of track should be  
 (a) **6 m.** (b) 5 m. (c) 6.5 m. (d) None of the above.
189. Width of metalling for road surface between the gates is  
 (a) 2 m more than the width of road. (b) 1 m more than the width of road.  
 (c) 1 m less than the width of road. (d) **same as that of the width of road.**
190. Gradient of the road between that gate of any LC should be maintained as  
 (a) **Level** (b) not steeper than 1 in 1000  
 (c) not steeper than 1 in 400 (d) not steeper than 1 in 600
191. Special class LC have TVU more than  
 (a) 10,000 (b) 1,00,000 (c) 5,000 (d) **50,000**
192. For class II roads level length of road outside gate on each side is  
 (a) 15 m. (b) **8 m.** (c) 3 m. (d) 30 m.
193. Railways can de-man an existing LC in case the TVU falls below ----- % of the value of the revised criteria laid down for manning  
 (a) 50 (b) 60 (c) 70 (d) **80**
194. After required level portion the Class II approach should not steeper than  
 (a) **1 in 30** (b) 1 in 20 (c) 1 in 40 (d) 1 in 15
195. Minimum length of Guard rails (for a square LC) for LC other than “D” Class is--- m more than the width of the gate.  
 (a) 1 m (b) 1.2 m (c) **2 m** (d) 2.2 m
196. Desirable straight length of Road outside the gate for “A” Class LC on Class II road is ----- m.  
 (a) 15 m (b) **22.5 m** (c) 30 m (d) 33.5 m
197. Minimum radius of centre line of road on curved approaches at the LC of National Highways Plain country is ----- m.  
 (a) 300 m (b) **250 m** (c) 200 m (d) 90 m
198. The census at LC shall be once in  
 (a) 6 years (b) 5 years (c) 4 years (d) **3 years**

199. The distance of W/L boards for unmanned LC on single line section and where visibility is clear should be ----- m.  
 (a) 600 (b) 500 (c) **350** (d) 550
200. For calculation TVU, the unit adopted for Cycle Rickshaws is  
 (a) 1 unit (b) 0.75 unit (c) **0.5 unit** (d) 0.25 unit
201. The speed breaker should be provided on either side of LC such that the maximum camber is ----- cm.  
 (a) 125 (b) **12.5** (c) 135 (d) 13.5
202. Height gauge is provided at a distance of ----- m from gate post on LC  
 (a) 3 m (b) 4 m (c) 5 m (d) **8 m**
203. Speed breaker should be provided on LC at a distance of ----- m from gate post.  
 (a) 6 m (b) 10 m (c) 15 m (d) **20 m**
204. First sign board for Road users at a distance of ----- m from the manned LC.  
 (a) 150 (b) **200** (c) 250 (d) 300
205. Width of Speed Breaker should be ----- cm.  
 (a) **200** (b) 175 (c) 150 (d) 100
206. ----- Class LC is meant for Cattle crossing.  
 a. A Class b. B Class c. C Class **d. D Class**
207. The LC located within station limits is called ----- gate.  
 a. Engineering **b. Traffic** c. S & T d. None
208. The LC located outside the station limit is called ----- gate.  
**a. Engineering** b. Traffic c. S & T d. None
209. Zonal contract is for the period from 1<sup>st</sup> \_\_\_\_\_  
 a) March b) January c) **July**
210. In case of Limited tenders, the number of offers should be at least \_\_\_\_\_ from the approved list of contractors  
 a) 5 b) **10** c) 7
211. The route between JTJ and ED is called .....?  
 (a) A route (b) **B route** (c) C route (d) None
212. The route between TVC and NCJ is called .....?  
 (a) A route (b) B route (c) **E route** (d) None
213. Which material of P.Way is used to hold the rails in position and correct gauge?  
 (a) Rails (b) **Sleeper** (c) Ballast (d) Fish Plate
214. Which is the suitable material to provide good drainage on P.Way?  
 (a) Sand ballast (b) Moorum ballast (c) **Stone ballast** (d) None



215. The width of Broad gauge ..... ?  
 (a) 1675 mm (b) **1676 mm** (c) 1750 mm (d) 1670 mm
216. The width of Dynamic gauge..... ?  
 (a) 1675 mm (b) 1676 mm (c) **1750 mm** (d) 1670 mm
217. The distance between inner face of rail head is called..... ?  
 (a) Twist (b) Creep (c) **Normal Gauge** (d) None
218. The distance between centre of top of head of rails is called..... ?  
 (a) Normal Gauge (b) **Dynamic gauge** (c) Surface gauge (d) Head gauge
219. The prescribed Rail section is to be used for the GMT between 10 and 20 for Group B Route?  
 (a) 52 Kg (b) 90 R (c) **60 Kg** (d) 75 R
220. In sleeper density M+7, M stands for?  
 (a) Gauge (b) **Standard Rail length** (c) Width of sleeper  
 (d) Sleeper standard
221. What is the recommended sleeper density for the route is allowing heavy axle load wagons?  
 (a) 1540 (b) 1340 (c) **1660** (d) 1310
222. What is the full form of TSR in caution order?  
 (a) Through Sleeper Renewal (b) **Temporary Speed Restriction**  
 (c) Turn Out Sleeper Renewal (d) None
223. The weight of 90 R Rail is.....  
 (a) 42.41 Kg (b) 44.21 Kg (c) **44.61 Kg** (d) 44.65 Kg
224. The weight of 75 R Rail is .....  
 (a) 37.10 Kg (b) **37.13 Kg** (c) 37.15 Kg (d) 37.11 Kg
225. What is the total GMT of 60 Kg Rail can carry during the service life?  
 (a) **800 GMT** (b) 870 GMT (c) 880 GMT (d) 890 GMT
226. What is the spacing of sleeper for M+7(1540) density?  
 (a) 600 mm (b) **640 mm** (c) 680 mm (d) 610 mm
227. What is the spacing of sleeper for 1660 (M+7) density?  
 (a) **600 mm** (b) 640 mm (c) 650 mm (d) 610 mm
228. What is the clear distance between two consecutive bridge Timbers or Girder bridge?  
 (a) 450 mm (b) **510 mm** (c) 500 mm (d) 520 mm
229. What is the clear distance between two consecutive steel channel sleepers on Girder bridges?  
 (a) **450 mm** (b) 510 mm (c) 500 mm (d) 460 mm

230. What is the total quantity of 52 Kg rails required for making track renewal of Two KM length?  
 (a) 140 MT                    (b) **208 MT**                    (c) 210 MT                    (d) 200 MT
231. How many sleepers required for M+7 density for Group D line?  
 (a) 1510 Nos                    (b) **1540 Nos**                    (c) 1560 Nos                    (d) 1340 Nos
232. How many sleepers required for M+7 density for loop line?  
 (a) 1510 Nos                    (b) 1310 Nos                    (c) 1380 Nos                    (d) **1320 Nos**
233. How much tensile strength in respect for 60 Kg (90 UTS )Rail?  
 (a) 59 Kg/sqm.                    (b) 60 Kg/sqm                    (c) **90 Kg/sqm**                    (d) None
234. What is the grade of 52 Kg (90 UTS) Rails?  
 (a) 800                    (b) **880**                    (c) 850                    (d) 890
235. How much GMT of 52 Kg Rails can carry during the service life?  
 (a) 500 GMT                    (b) **525 GMT**                    (c) 515 GMT                    (d) 550 GMT
236. What is the crushing strength of concrete sleeper after 28 days curing?  
 (a) 510 Kg/sqm.                    (b) **525 Kg/sqm**                    (c) 530 Kg/sqm                    (d) 560 Kg/sqm
237. What is the length of Concrete sleeper?  
 (a) 2650 mm                    (b) **2750 mm**                    (c) 2800 mm                    (d) 2720 mm
238. Bottom width of Concrete sleeper is .....?  
 (a) 210 mm                    (b) 220 mm                    (c) **250 mm**                    (d) 350 mm
239. Height of Concrete sleeper is.....?  
 (a) 200 mm                    (b) **210 mm**                    (c) 320 mm                    (d) 220 mm
240. Which is the RDSO drawing No. for the GFN Liner of 60 Kg rails?  
 (a) T 3702                    (b) T 3705                    (c) **T 3706**                    (d) T 3704
241. Which is the RDSO drawing No. for the GFN Liner of 52 Kg rails?  
 (a) **T 3702**                    (b) T 3705                    (c) T 3706                    (d) T 3704
242. What is the minimum ballast cushion available for 52 Kg/1540/LWR Group B Route?  
 (a) 200 mm                    (b) 150 mm                    (c) **250 mm**                    (d) 300 mm
243. What is the minimum ballast cushion available for the routes having heavier axle load of wagon?  
 (a) 300 mm                    (b) **350 mm**                    (c) 250 mm                    (d) 380 mm
244. The maximum value of aggregates abrasion test for stone ballast for BG is .....?  
 (a) 25                    (b) 35                    (c) **30**                    (d) 20
245. How much quantity of stone ballast required for the cushion of 250 mm of BG/ PSC/LWR track?

- (a) 2000 Cum/KM    **(b) 1954 Cum/KM**    (c) 2110 Cum/KM    (d) 1375 Cum/KM
246. How much quantity of stone ballast required for the cushion of 300 mm of BG/ PSC/LWR track?  
 (a) 2500 Cum/KM    **(b) 2158 Cum/KM**    (c) 3000 Cum/KM    (d) 3500 Cum/KM
247. What is standard formation width of single line P.Way as per Board's revised Norms?  
 (a) 6100 mm    **(b) 6850 mm**    (c) 6900 mm    (d) 6500 mm
248. What is the formation width of P.Way at cutting for single line Track?  
 (a) 6100 mm    (b) 6200 mm    **(c) 6250 mm**    (d) 6300 mm
249. How much slope that can be provided from centre line of formation towards the cess?  
 (a) 1 in 20    **(b) 1 in 40**    (c) 1 in 30    (d) 1 in 10
250. What is the cant generally provided at rail seat PSC Sleeper?  
**(a) 1 in 20**    (b) 1 in 15    (c) 1 in 25    (d) 1 in 10
251. Which type of device that can be utilized to join the different rails in cross section?  
 (a) Joggled Fish Plate **(b) Combination Fish plate** (c) Glued Joint (d) Ordinary Fish plate
252. Which type of device that can be provided at the end of each LWR/CWR?  
 (a) Switch rail joint    **(b) Switch Expansion Joint** (c) Glued Joint    (d) Buffers
253. How many numbers of ERCs that can be provided for M+7(1540) density Track?  
 (a) 6200    (b) 6500    **(c) 6160**    (d) 6300
254. How many No. of Rubber pads that can be provided for 1660 Nos of density?  
**(a) 3320 Nos**    (b) 3310 Nos    (c) 3100 Nos    (d) 3500 Nos
255. Dynamic gauge for BG?  
**(a) 1750 mm**    (b) 1676 mm    (c) 1057 mm    (d) 1800 mm
256. The Indian Railways designation for curve is done by .....?  
 (a) Degree    (b) Radius    **(c) Degree and Radius**    (d) Cant
257. Minimum clearance of check rail provided in BG curve is.....?  
 (a) 40 mm    (b) 42 mm    **(c) 44 mm**    (d) 50 mm
258. Trolley refugees are provided at a distance of.....?  
 (a) 150 m    **(b) 100m**    (c) 200 m    (d) 120 m
259. The degree of curve of radius 700 m is .....?  
 (a) 2 Deg.    **(b) 2.5 Deg**    (c) 1.5 Deg    (d) 4 Deg
260. What is the shoulder ballast width on the outside of BG LWR curved Track?  
 (a) 450 mm    (b) 510 mm    **(c) 500 mm**    (d) 550 mm
261. When new materials are used for renewal which is called....?  
 (a) Secondary    (b) Planned    **(c) Primary**    (d) Casual

262. The machine used for cleaning ballast on track is called.....?  
 (a) BRM (b) PQRS (c) **BCM** (d) BKH
263. The track renewal works are being carried out with the help of one of the following..  
 (a) BRH (b) TRC (c) **TRT** (d) BOH
264. What is the width of Auxiliary BG track for PQRS movement?  
 (a) 1676 mm (b) **3400 mm** (c) 1057 mm (d) 3500 mm
265. Deep screening should be done once in ----- Years.  
 (a) 5 yrs (b) 3 yrs (c) **10 yrs** (d) 2 yrs.
266. Recommended formation width of double line BG track is -----  
 (a)10.58m (b)**11.58 m** (c)12.58 m (d) 13.58m.
267. For preparing patrol charts the average speed of patrolman is taken as ----- .  
 kmph.  
 (a) 2 kmph (b) **3 kmph** (c) 5 kmph (d) 1 kmph.
268. The parts of CST-9 sleepers are -----.  
 (a) **CST-9 plates, cotters, tie bar, steel keys.**  
 (b)CST-9 plates, cotters, loose jaws, Tie bars.  
 (c)CST-9 plates, Inserts, ERC, Tie bars.  
 (d)CST-9 plates, Cotters, ERC, Tie bars.
269. On LWR track which type of glued joints are used?  
 (a) **G3(L)** (b)G3(S) (c)G3(T) (d)G3(M)
270. Which sleeper is having long life?  
 a) CST-9 b)Steel (c) Wood (d) **PSC**
271. SEJ is used at locations where the track is laid with -----  
 (a) SWP track (b) **LWR track** (c)Free rail (d) none
272. The wt. of new 90R rail is -----  
 (a)40.41 kg (b)**44.61 kg** (c)45.61kg (d)46.6 kg.
273. The wt of BG PSC sleeper incl.fittings is-----  
 (a) 256 kg (b) **286 kg** (c) 290kg d) 300 kg
274. During civil disturbance which patrolling is introduced?  
 (a)Cold weather patrolling (b)Hot weather patrolling  
 (c)**Security patrolling** (d) Monsoon patrolling.
275. When the two tracks are intersecting which type of crossing is to be introduced?  
 (a)Scissor (b)**Diamond** (c)Built up (d)CMS
276. Complete Track Renewal with using released materials is called-----  
 (a)Primary renewal (b)**Secondary renewal** (c)Casual renewal (d)Rail renewal.

277. The released materials which can be reused are classified as ----  
 (a) Class – I                    **(b) Class – II**                    (c) Class-III                    (d) Class IV
278. What is the frequency for testing of rails by TRC on the routes which exceeding speeds above 130 kmph?  
 (a) Once in 3 months **(b)Once in 2 months** (c) once in 4 months (d) Once in a month.
279. What is the frequency for testing of rails by TRC on the routes which exceeding speeds above 110 kmph and up to 130 kmph?  
**(a) Once in 3 months** (b)Once in 2 months (c) once in 4 months (d) Once in a month.
280. What is the frequency for testing of rails by TRC on the routes of A and B  
 (a) Once in 3 months (b)Once in 2 months **(c) once in 4 months** (d) Once in a month.
281. What is the frequency of OMS 2000 on the routes of A & B for speeds above 100 kmph.  
 (a) Once in 2 months **(b)Once in a month** (c) Once in 3 months (d) Once in 4 month
282. What is the bottom width of 60 kg rail.?  
 (a) 140mm                    **(b) 150mm**                    (c) 160mm                    (d) 172 mm\
283. What is the height of 52 kg rail.  
 (a) 160mm                    **(b) 156 mm**                    (c) 168 mm                    (d) 172 mm.
284. What is the total qty. of earth work required for 1 km length of track having 2m height with 1 : 1 slope of BG route.  
 (a) 17000 cum                    **(b) 17700 cum**                    (c) 16500 cum (d) 17500 cum
285. If the rate of 52kg rail is rs.53000/MT what is the estimated cost of Rails for 1 km length of track.  
**(a) Rs.5512000** (b) Rs.5600000 (c) Rs.5510000 (d) Rs.5513000.
286. If the BG PSC sleeper cost is Rs. 1410/ set incl. fittings find out the cost of sleepers per 1 km length of track with M+7 density.  
 (a) Rs.2171500 (b) Rs.2171300 **(c) Rs.2171400** (d) Rs.2172000.
287. If the estimated cost of CTR work is 15.15 crores. Who is the sanctioning authority for the above.?  
**(a)PHOD** (b) DRM (c) ADRM (d) JAG
288. If the cost of TRR work is Rs. 14. crores and involving material modification cost of Rs. 40 lakhs, the estimate can be sanctioned by -----  
 (a) DRM (b) PHOD **(c) GM** (d)Railway Board.
289. A CTR work costing Rs. 10 cr. And no additional items introduced. Who will be the sanctioning authority for the above estimate.  
**(a) DRM** (b) JAG (c) PHOD (d)Railway Board.
290. If the cost escalation exceeds 100% over abstract cost the estimate requires ----- sanction.

- (a) GM                      (b) CRS                      (c) **Railway Board**      (d) DRM
291. If the material modification cost with in 5 % of estimated value, the estimate can be sanctioned by -----  
 (a) PHOD                      (b) **GM**                      (c) DRM                      (d) JAG
292. The total value of out-of – turn works should not exceed Rs.----- crores for obtaining sanction of GM in respect of safety related works per anum.  
 (a) 6 cr                      (b) **8 cr**                      (c) 10 cr                      (d) 5 cr.
293. The estimate value of out –of –turn track renewal work should not exceed Rs.-----  
 (a) Rs 30 lakhs                      (b) **Rs.50 lakhs**                      (c) Rs.40 lakhs                      (d) 100 lakhs.
294. The vertical wear for 52kg rails should not exceed -----  
 (a) 8 mm                      (b) 6 mm                      (c) **5 mm**                      (d) 4 mm
295. The vertical wear for 60kg rails should not exceed -----  
 (a) **8 mm**                      (b) 6 mm                      (c) 5 mm                      (d) 4 mm
296. The lateral wear for 60 kg rail should not exceed-----  
 (a) 6 mm                      (b) **8 mm**                      (c) 5 mm                      (d) 4 mm
297. The lateral wear for 52 kg rails should not exceed -----  
 (a) **6 mm**                      (b) 8 mm                      (c) 5 mm                      (d) 4 mm
298. The longitudinal movement of rails towards direction of traffic is called  
 (a) Crib                      (b) **Creep**                      (c) Slope                      (d) pulling.
299. The recommended minimum ballast cushion for the routes where 22.1 t axle load rolling stock is nominated to run is -----  
 (a) 300 mm                      (b) **350 mm**                      (c) 250mm                      (d) 150 mm.
300. One of the equipment that should have the patrolman is—  
 (a) Balloon                      (b) **whistle thunderer** (c) Doll  
 (d) Tiffinc arrier.
301. When the damage of track due to heavy floods is detected by patrolman the first duty is---  
 (a) run away from the track                      (b) To call the public  
 (c) **Protection of railway line.**                      (d) to shout.
302. While preparing patrol charts the length of beat should not exceed -----.  
 (a) 3 km                      (b) **5 km**                      (c) 8 km                      (d) 10 km.
303. \_\_\_\_\_ is recovered from the running bills of successful bidder of contract  
 a) EMD                      b) **SD**                      c) CD
304. All instructions to the contractor is given by \_\_\_\_\_  
 a) oral                      b) **written**                      c) both a& b
305. Contractor shall commence the work within \_\_\_\_ days after receipt of letter of authority

- a) 7                                      b) 3                                      c) **15**
306. In Measurement book, \_\_\_\_ pages to be machine numbered.  
a) odd                                      b) even                                      c) **all**
307. Security deposit is \_\_\_\_% of contract value.  
a) 2                                      **b) 5**                                      c) 10
308. Maximum value of Limited tender by PHOD is \_\_\_\_  
a) 15 crores                                      **b) 20 crores**                                      c) 5 crores
- 309 Approved list of contractor is prepared in consultation with \_\_\_\_ department  
a) stores                                      b) signal                                      **c) accounts**
310. Termination of contract can be given by the officer \_\_\_\_\_ the accepting authority.  
a) lower than                                      **b)not lower than**                                      c) none of the above
311. Open tender is published atleast in \_\_\_\_ regional paper  
a) **1**                                      b) 2                                      c) 3
312. A tender which is submitted after due date and time of submission but before opening is called \_\_\_\_ tender  
a) Open r                                      b) Late                                      **c) Delayed**
313. The amount of EMD for a work of 4 lakhs is Rs.\_\_\_\_\_  
a) 4000                                      b) **8000**                                      c) none of the above
314. The maximum value of work order with in powers of DEN is Rs.\_\_\_\_\_  
a) **25,000**                                      b) 50,000                                      c) 100,000
315. For quotations, annual ceiling for Sr.DEN is Rs.\_\_\_\_\_  
a) 1                                      b) 5                                      c) **2**
316. The water supply system should be designed on the basis of at least \_\_\_\_liters/person/day  
a.150                                      **b.200**                                      c.250                                      d. None of the above
317. The minimum residual free chlorine should be available at tail end point  
a. 0.1 ppm                                      **b. 0.2 ppm**                                      c. 0.3 ppm                                      d. None of the above
318. The spacing of manholes designed for 300 mm diameter sewer is  
a. 30 meters    b. 40 meters                                      **c. 45 meters**                                      d. None of the above
319. Water cooler may be provided if the total number of passengers is more than \_\_\_\_\_ per day.  
a. 500                                      **b. 1000**                                      c. 2000                                      d. None of the above
320. Horizontal separation for water main to any drain and sewer \_\_\_\_\_ m  
a. 1m                                      b. 2m                                      **c. 3m**                                      d. None of the above
321. The rate of flow at delivery end of hydrant shall not be less than \_\_\_\_\_liters/min.

- a. **100**                      b. 150                      c. 200                      d. None of the above
322. Water borne diseases are caused due to \_\_\_\_\_ impurities  
a. Physical                      b. Chemical                      **c. Bacterial**                      d. None of the above
323. pH value is a symbol for \_\_\_\_\_ concentration.  
**a. Hydrogen ion**                      b. Nitrogen ion                      c. calcium ion                      d. None of the above
324. The aeration of water is done for the removal of \_\_\_\_\_.  
a. Bacteria                      b. colour                      **c. odour**                      d. None of the above
325. In monsoon period, \_\_\_\_\_ works should not be carried out.  
**a. Renovation**                      b. Construction                      c. Earthwork                      d. None of the above
326. In water distribution system at consumers end, the minimum residual gauge pressure should be \_\_\_\_\_ kg/cm<sup>2</sup>.  
a. 1                      b. 2                      **c. 4**                      d. None of the above
327. Maximum Velocity of flow in a sewer is recommended not to exceed \_\_\_\_\_ mps  
a. 1                      **b. 2**                      c. 3                      d. None of the above
328. Clogging due to fine sand, clay and sand the material used for removing clogging  
**a. Sodium hexametaphosphate**                      b. Hydrochloric acid                      c. Chlorine
329. Data for Estimating Requirements of Water for C.C Apron washing  
a. 5 lits/ per sqm                      **b. 10 per sqm**                      c. 15 per sqm                      d. None of the above
330. Data for estimating requirement of water for washing of carriage on PF of BG coach  
a. 2600 litres                      b. 3600 litres                      **c. 500 litres**                      d. None of the above
331. Quantity of water required for washing of carriages on pit lines for BG  
**a. 3600 lit per carriage**                      b. 3000 lit per carriage                      c. 2800 lit per carriage
332. Clogging of well due to chemical can be removed by using  
**a. Hydrochloric acid**                      b. Chlorine                      c. Sodium hexametaphosphate
333. Absolute verticality is ideal to a deviation of 100mm per \_\_\_\_\_ metres of boring is generally acceptable where submersible pumps are not to be installed.  
a. 20 m                      **b. 30m**                      c. 45m                      d. None of the above
334. The suction lift, which should be made as low as possible; the greatest suction-lift that may be expected at sea-level is about.  
a. 12m                      b. 10m                      **c. 7m**                      d. None of the above
335. The delivery pipe shall be of such size that the velocity of water is about  
a. 2 m/s.                      **b. 2.5 m/s.**                      c. 3 m/s.                      d. None of the above

## II. Fill in the blanks

1. Normal position of gates at level crossings should be kept ----- to road traffic.



**(Closed)**

2. Gate lodges shall be so sited that a ----- and ----- view is obtained for all the approaching trains.

**(Clear, unobstructed)**

3. Where the LC is on a curve, the gate lodge should be built on the ----- side of the curve.

**Outside**

4. For calculating TVU the unit adopted for any Rail vehicles is -----.

**( One)**

5. For calculating TVU the unit adopted for Bullock cart is -----.

**( One)**

6. Wicket gates are provided for the use of -----.

**(Pedestrians)**

7. Normal position of gates in Special and “A” Class LCs are ----- to road traffic.

**( Open)**

8. No manning of unmanned LC shall be done if ----- do not ply regularly.

**( Motor vehicles)**

9. ----- lifting barriers shall not be provided on LCs.

**( Double)**

10. All lifting barriers and Swing gates will be provided with ----- tapes and strips to improve the visibility of the gates to the road users.

**( Retro reflective)**

11. The radius of camber of the speed breaker is -----.

**( 4 m)**

12. Speed breaker should be painted in ----- and ----- colour paints.

**( White and yellow)**

13. The released rails are classified by \_\_\_\_\_

14. No of form for NS Indent is S\_\_\_\_\_

15. Stock verification of T&P is carried out once in \_\_\_\_\_

16. Challans are prepared with \_\_\_\_ form.

17. No of form for Stock Indent is S\_\_\_\_\_

18. Stock indent is prepared in \_\_\_\_\_ number of copies.

a) 2                      b) 6                      c) 5

19. The accounts stock verification of P.WAY materials are conducted once in \_\_\_\_\_ years

a) 1                      b) 2                      c) 3.

20. DMTR is used to account of stores\_\_\_\_\_.

- a. receipts only    b. issues only    c. both a& b

21. Reserve price is fixed to sell the scrap materials by \_\_\_\_\_.

- a. PCE                      b. COS                      c. FA & CAO

22. Permanent way materials of stock items are comes under \_\_\_\_\_ P.L. group.

23. Stock sheets are prepared in \_\_\_\_\_ copies after stock verification.

24. The P.L. number is codified in eight digit number (T/F)

25. Price list classification number has \_\_\_ digits.

- a) 6                      b) 8                      c) 10

26. RMC note is used for transporting \_\_\_ materials.

- a) Rly                      b) Defence                      c) Public

27. Stock verification of P.Way material is carried out once in \_\_\_ years

28. Dead stores are the items not used for more than \_\_\_ months.

29. Reinforced concrete pipes are used in water supplies are classified as P2 with test pressures of \_\_\_\_\_ kg/cm<sup>2</sup>    **(4 kg/cm<sup>2</sup>)**

30. For use on gravity mains, the working pressure should not exceed \_\_\_\_\_ of the test pressure. **(2/3)**

31. PSC competes economically with steel for pipe diameters of \_\_\_\_\_ mm and above    **(600)**

32. A minimum of \_\_\_\_\_ minutes contact time must be provided before delivery of water to the consumer    **(30 to 60)**

33. Tanks used for the storage of drinking water should be rubbed and cleaned at such intervals as specified by the    **(DEN)**

34. The number of service pipes 20mm dia that can be supplied from a properly designed distribution-main of 100 mm dia \_\_\_\_\_    **(56)**

35. Minimum residual pressures at ferrule points for two storey building is    **(12m)**

36. Generally \_\_\_\_\_ % of the water supplied may be considered to reach the sewers    **(80)**

37. Vertical separation for water main to any drain and sewer \_\_\_\_\_ m    **(0.5)**

38. Data for estimating requirement of water for office per head per day    **(45 litres)**

## II. Write short answers for the following:

1. Write the classifications of BG and MG routes.
2. Give an example of B route in Southern Railway.
3. Give an example of D and C route in Southern Railway.
4. Give an example of E route in Southern Railway.
5. The route between MS and TPJ (Chord Line) classified as which route?

6. Maximum permissible speed of A and B routes?
7. Write short notes on the following.
  - (a) LWR      (b) SEJ
8. Expand the following.
  - (a) SWP      (b) SEJ      (c) LWR      (d) SRJ
  - (e) GJ      (f) MSP      (g) CST-9      (h) PSC
  - (i) TRT      (j) PQRS      (k) USFD      (l) TRC
  - (m) SPURT      (o) OMS      (p) DRT Machine
  - (q) SOD      (r) SOP
9. Dimension of fouling mark and where it will be provided?
 

Length = 1500 mm  
Breadth = 250 mm  
Thickness = 125 mm

Fouling mark should be provided at the point where the two tracks are converging each to less than the minimum width as per SOD.
10. Write the various types of Points and Crossings in BG.
11. Expand the following.
  - (a) IRPWM      (b) IRWM      (c) IRFC
  - (d) IRCTCL      (e) IREM      (f) RITES
12. Expand the following.
  - (a) IRCON      (b) CONCOR      (c) KRCL      (d) IRWO
  - (e) CRIS (Centre for Railway Information System)
13. What is the main function of Sleeper in the Railway Track?
  - (i) To hold the Rail in position.
  - (ii) To hold correct gauge with the help of fittings and fastenings.
  - (iii) To transfer the dynamic loads to the ballast.
14. What is the main function of Stone Ballast?
  - (i) To give uniform level surface.
  - (ii) To provide proper drainage.
  - (iii) To transfer the load to a large area of formation.
15. What is the recommended track structure for BG route if the GMT more than 20?
 

A: 60 KG/ PSC/ 1660/ LWR
16. What is meant by sleeper density?
17. Differentiate between Sleeper density and Traffic density.
18. Write down the different types of sleepers are being used on track.
19. Write standard Rail sections being used Indian Railways.
20. Explain the 60 KG (90 UTS) rail.
21. Furnish the weights of the following standard rail sections.
  - (a) 60 kg (90 UTS) - Wt. 60 KG per Metre of new Rail.
  - (b) 52 Kg (90 UTS) - Wt. 52 KG per Metre of new Rail.
  - © 90 R rails - Wt. 44.61 KG per Metre of Standard Rail.90lbs/Yd
  - (d) 75 R rails - Wt. 37.13 KG per Metre of Standard Rail 75 lbs/Yd.
  - (e) 60 R rails - Wt. 29.76 KG per Metre of Standard Rail 60 lbs/Yd.
  - (f) 50 R rails - Wt. 24.80 KG per Metre of Standard Rail 52 lbs/Yd.
22. Explain the 90 UTS.
23. The Roll mark of rail section is as follows.

IR → 60 → 880 → TISCO → II 2000 → Basic BASSEMER  
 What is the significance of IR → 60 → 880?

24. Write the chemical composition of Rail.

A: (a) Carbon (b) Manganese (c) Sulphur  
(d) Phosphorous (e) Silica

25. What is the standard length of Rail for BG?

26. Explain the GMT. What is the total GMT which 60 KG (90 UTS) rail can carry during their service life? A: GMT means total service life carried by the rails in terms of GMT. 60 kg rails - 800.

27. Draw the neat rough sketch of Rail battering and Rail hogging.

28. Write the various types of fractures in rails. What type of device being used in Indian railways for detecting defects in rails for day to day maintenance?

- (a) Rail Fracture
- (b) Weld failure

USFD machines are being used for detecting the defects (failure) in Rails.

29. What is meant by FLAW? How it will be detected?

30. What are the probes used in USFD machines to detect the flaws in rails?

A: (i) 0 deg Probe (ii) 70 deg Probe  
(iii) 37 deg Probe (iv) 80 deg Probe

31. Expand the following.

(i) IMR (ii) REM (iii) OBS (iv) DFW

32. What is the Sleeper spacing for M+7 density and M+4 density?

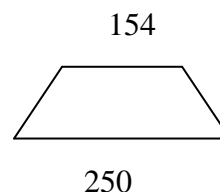
A: M+7 - 680 mm  
M+4 - 840 mm  
M+7 (1660) - 600 mm

33. What are the types of sleepers are used in Railways?

Wooden, CST -9, Steel, Concrete Sleepers (PSC)

34. Standard Size of PSC sleeper and draw the plan and cross section of PSC sleeper and show the dimensions.

Length - 2750 mm  
Height - 210 mm



35. What is mean by CSI (Composite Sleeper Index)?

It is an index to determine the suitability of a particular timber for use as a sleeper from the Mechanical strength point of view.

36. Expand the following.

(a) ERC (b) GFN (c) GRP

37. Write three advantages and disadvantages of using concrete sleeper on P.Way.

38. Explain about Combination Fish Plates. Where it will be utilized?

39. Write the fittings of PSC Sleeper?
40. Mention the drawing numbers of GFN Liners?  
 60 KG - RDSO Drg. No.T-3706  
 52 KG - RDSO Drg. No. T-3702
41. Give the drawing numbers of Metal Liners?  
 60 KG - RDSO Drg. No.T-3740  
 52 KG - RDSO Drg. No. T-3736
42. Give the drawing numbers of Modified liners and Composite liners?
- | <u>Metal Liner</u> | <u>GFN Liner</u>   |
|--------------------|--------------------|
| T- 3741            | T- 3707 (inside)   |
| T – 3742           | T – 3708 (outside) |
43. What is the minimum depth of ballast cushion for A, B, C, D and E routes?
44. List out the various tests being conducted for stone ballast? What are the maximum values for the same?
45. Explain the size and Gradation of Stone ballast?
46. How many type of Crossings in use? What are they? Explain briefly.  
 There are two types of Crossings,  
 Built-up Crossing and CMS Crossing  
**Built –up Crossing:** This type consists of two wing rails and “V” which consists of point rail and split rail are assembled together by means of distant blocks to form a crossing. Regular attention in maintenance is required.  
**CMS Crossing:** Cast Manganese Steel Crossing, free from bolt as well as loose components which may work loose or wear under traffic and their use. Less maintenance even heavy traffic density.
47. List out various parts of Turnouts; and draw rough line diagram.
48. What is meant by Normal gauge and Dynamic gauge? Give the dimensions.
49. What is meant by Creep?
50. Explain briefly about the deep screening?
51. Expand BCM and BRM in respect of Ballast?
52. What is the estimated cost of Rails and Sleepers for One KM length of BG Track (A-Route)? 60 KG Rail cost is Rs. 53,000 for MT. and PSC Sleeper cost is Rs 1,410 per set.
53. What is meant by Super Elevation and where it is provided?
54. What are all the various types of curves?  
 (a) Vertical Curve (b) Circular Curve  
 © Compound Curve (d) Reverse Curve
55. What are the various welding techniques are being used in Indian Railways?  
 (a) Gas pressure welding (b) Electrical Arc welding  
 © Flash Butt Welding(FBW) (d) Thermitite welding
56. Explain briefly about Destressing?
57. What are the parameters recorded in Track Recording Car?
58. Details of frequency of testing of TRC in various routes?
59. What are the parameters recorded in OMS 2000?
60. Frequency of tests of OMS2000 for speeds above 100 Km/h BG route?
61. What are all the various track renewals are carried out in P.Way and explain briefly?
62. What are the criteria for Rail renewal?  
 (i) Service life of Rails in GMT  
 (ii) Condition Basis  
 (iii) Planned Basis
63. Draw the rough sketch showing the vertical and lateral wear of rails and show the tolerance?
64. What is the service life in GMT for 60 KG and 52 KG rails?

|              |           |
|--------------|-----------|
| 60 KG 72 UTS | - 550 GMT |
| 60 KG 90 UTS | - 800 GMT |
| 52 KG 72 UTS | - 350 GMT |
| 52 KG 90 UTS | - 525 GMT |

65. List out the various types of Patrolling exists in Indian railway?
66. List out the various types of Estimates?
67. What is material modification?
68. Write the formula for assessing Gang strength and explain the significance of each letter?
69. Explain about Track chart? What is the use of Track chart?
70. How are bridges classified into major and minor bridges in Indian Railways?  
(Para 1103(3)(b))
71. What are called important bridges in Indian Railways?  
(Para 1103(3)(a))
72. Mention the types of foundation adopted for Railway Bridges.  
(Para 316)
73. Write down the minimum Vertical Clearances required for slab/girder bridges with different discharges.  
(Para 312)
74. What is free board (FB) in Railway bridges? Give the minimum free board required. (Para 313)
75. Enumerate the types of pile foundation based on the manner of transfer of load and construction methods.  
(Para 407)
76. What is a distressed bridge? Mention the two categories.  
(Para 503)
77. Give the types of well foundation adopted in Railways with the sketch of the shapes.
78. Mention the methods of regirdering adopted in Railways.  
(specify only the methods).  
(Para 621)
79. Define danger level and highest flood level at bridges.  
(Para 703)
80. Enumerate the types of bridges based on structures in Indian Railways.
81. Mention the types of river training works adopted in Railway bridges.  
(Para 808)
82. What is TVU? How is it calculated? Mention the TVUs required for an unmanned level crossing to be manned and a manned level crossing to be replaced with a ROB.
83. Write short notes on “ M 25 grade controlled concrete “.
84. Expand th following  
A)SK      b)SPEC      c)STD d)THK.  
a. Sketch.  
b. Specification  
c. Stacndard  
d. Thick.
- 85.Exapnd the following  
a.DIM   b.DRG   c.EXT   d. FIG

- a.Dimension
- b.Drawing
- c.external
- d.Figure.

86 .a) NBC b) LAW c) RTS d) OLWR

- a) National Building code
- b) B) List of approved works
- c) Rolled tongue steel
- d) Open line works Revenue.

87. Write short notes: Revised estimate  
Ans: Para 706 of Engg.code

Urgency certificate  
Ans: para 1103 of Engg.code

88. Expand the following;  
a) SOR, b) PB, c) BC1 d) DRF

- Ans: a) Schedule of rates  
b) Pick Book  
c) Building cost index  
d) Depreciation Reserve fund

89. Write notes on cent age charges  
Para 732 e

90. Mention the kind of estimates  
Para 701 of engg. Code

91. Define Isolated works

Ans. Works which are done in mid sections alongside the track  
Within the Railway limit i.e. generally those lying outside the outermost signal of block stations  
An extra payment of 10% will be allowed over and above the rate in this schedule

92. Define Departmental charges  
Para 1137 of Engg. Code

93. Define Deposit works  
Para 1843 of Engg. Code

94. Expand the following

- a) BIS, b) GB, c) MS d) DF

Ans. a) Bureau of Indian standard                      b) Green Book   c) Mild steel   d) Development fund

95. Write notes on  
BCI

Detailed estimate

Ans: para 703E

96. Mention the plinth area of type II staff Qrs. In sqm

- b) area of one unit
- c) meant for sleeping out balcony
- d) staircase circulation
- e) cycle shed, scooter, garage

97. Mention the plinth area of type staff III qrs. In sqm

- a) area of one unit
- b) meant for sleeping out balcony
- c) staircase circulation
- d) cycle shed, scooter, garage

Ans: P.No.36 of way and works manual

98. Give expansion for the following abbreviations.

APPRO

CL

C/C

CHKD

Ans: Approximate, Centre line, Center to center, Checked

99. Write notes on

An abstract estimate

Ans: para 702 of Engg code

Para 713 of engg.code

100. Expand the given abbreviations.

NO

OD

ID

DIA

Ans: Number

Outside

Inside diameter

Diameter

101. Write notes on

Rates

Contingencies

Ans: para 726E

727E

102. Give expansion for the following

GL, GEN, Qty. RD

Ans: Ground level, General, Quantity, Round

103. Write notes on



Schedule of rates

Siding charges (Ans: para 729 & 1831 of Engg.code)

104. Give the details of norms for the following fitments in an office buildings

a) Wash Basins

b) Drinking water fountains

105. Give the details of norms for the following fitments in a factory.

a) Washing tap with drinking arrangements

b) Ambulation taps

106. Self cleansing Velocity

107. How to improve the yield of open well in sandy soil.

108. List out any four types of pumps used in railways.

109. List out the any four type of sewer lines used.

110. How will you collect water sample for analysis?

111. How will you improve the yield in open well?

112. What are all the matters to be inspected by sanitation committees?

### III. Essay type questions:

- 1 Draw neat rough sketch of BG LWR Curved Track profile and show the various parts and dimensions (not to scale)?
- 2 Draw a neat diagram of Standard II B Class Station diagram with all features (not to scale)?
- 3 BG route of Group A having an existing rails of 52 kg LWR and PSC M+7 density with a ballast cushion of 250 mm is provided to renew with 60kg /PSC/1660/LWR to allow heavier axle loaded rolling stock. Assess the material required for 2 km length of track and its cost including widening cess to cater heavier loads.
- 4 What are all various types of estimates are being prepared in Engineering depts? Explain each. What is the delegation of powers of GM/PCE to sanction the track renewal estimates?
- 5 Explain the works program for track renewal works? Criteria for track renewals and how the works are being proposed and processed for inclusion in Pink Book.
- 6 Draw a neat Cross section of 60 KG rail and show the part and dimensions of each? Draw the neat sketch of Turn out 1 in 12 with parts and dimensions (Overall length)(not to scale).
- 7 Draw neat sketch of single line BG Track monsoon patrolling diagram. Explain briefly about various patrolling exists in Indian railway.
- 8 Draw the track diagram for 2 km length showing different rails, sleepers and densities, welding etc. as per Board norms with using different colours etc.
- 9 Work out the extra earth work required for B route BG track having CST -9 sleepers and proposed to renew with PSC sleeper for formation height of 2.5 m for 25 km length. The existing formation width is 6.50 m.
- 10 Draw the neat sketch of double line BG LWR track complete at cutting with ballast profile and showing the side drain and catch water drain (not to scale) and ballast etc.
- 11 Explain about vertical wear and lateral wear. Draw the neat cross section of rails showing the above and give the tolerance for both for 60 KG and 52 KG rail.
- 12 (a)What are the items covered in justification for proposing CTR works in FWP to get the approval of Railway Board?  
(b)Prepare an estimate for One KM length of CTR with 60 kg rails on PSC sleepers with M+7 (1660)density duly taking the released materials of 52kg/PSC/M+7 in to account?
- 13 (a) Write down the advantages and disadvantages of using PSC Sleepers in track? (b) Draw the plan, elevations and cross section of BG PSC Sleeper showing dimensions proportionately (not to scale).
- 14 (a) What is superelevation? What is the maximum cant permissible for BG track A and B route? Give the formula for super elevation?  
(b) Find out the degree of curve if the track is in circular curve if radius is 700 m?  
c) Find out the Super Elevation with above values?
15. Draw a temporary engineering indicators diagram for a bridge work (overall length of the bridge – 20m) in a single line section showing the salient dimensions.
16. Write the modus operandi (working instructions) for the replacement of existing 6.10 m span steel girder with precast PSC slab units using rail or road crane.
17. Work out the depth of construction for a bridge with PSC slab of thickness 600mm and 52 kg rail and draw half elevation and half section of the bridge with a span of (1 x 6.10m PSC slab) showing salient features.

18. Draw an elevation of temporary girder arrangements for construction of a cast-in-situ Box of size 2 m x 2 m with a 3.20m height of embankment from bed level duly dismantling an arch bridge of 1.2 m span in single stage under traffic conditions.
19. Draw an Elevation of a Foot Over Bridge (truss type) connecting two platforms with up and down lines in between at 5300mm centers and gangway and stairway width as 3000 mm indicating the span and other salient dimensions.
20. Draw reinforcement details sketch of a one way continuous slab for a hall of size 15 m x 6 m with 'T' beams of size 300 x 700 at 3 m centers with salient dimensions.
21. Draw a sketch showing the typical well foundation with its components. (Annexure 4/11, para 418 of IRBM)
22. What are bearings? Mention the types of bearings generally used in Railway bridges and sketch anyone of them. (Para 222)
23. Work out the quantity required for brickwork (23cm) above plinth
24. Work out the quantity required for RCC for roof slab
25. Arrive the cost for laying roof slab for the building
26. Furnish the rough cost for providing FOB on deposit terms
  - Gangway:- length 22m
  - Width 2m
  
  - Steps length: 21m
  - Width 2m
27. Prepare the rough cost for providing a subway barrel length of 10m with approaches of 30mx3m and 25mx3m on "Deposit terms"
28. Draw a line diagram for type I Qrs. For one unit – Assume data necessary.
  - Work out the Qty. of brickwork above pillar.
  - Qty. for plastering inside
29. Prepare rough cost for providing a halt station with amenities (assume necessary data etc.) on deposit terms.
30. Prepare rough cost with the following sub work for inclusion in works programme
  - Land acquire involves for 1200sqm
31. P.Way for 1600m with single loop of 1 in 8<sup>1</sup>/<sub>2</sub> point.
32. Explain different types of foundation
33. Prepare a detailed estimate for a high level PF for 270m x 7m
34. Draw Station building SB/3E, Assume data required
35. Prepare rough cost for providing a crossing station with amenities under deposit terms
36. What are the works can be taken up with regards to LC on MPLAP scheme?

With regards to level crossing provision of manning of unmanned level crossings and provision of Road Under Bridges/Road Over Bridges/Limited Height Subways work can be taken up under MPLAD Scheme.

37. Write short notes on classification of Level Crossings and the criteria for it.

| Class | Criteria   |
|-------|--|
| Spl   | - TVU > 50,000.  |
| A     | - TVU > 30,000 or<br>Line capacity utilisation > 80 % (on Single Line) and Road Vehicles > 1000. |
| B     | - TVU > 20,000 and Road vehicles >750.   |
| C     | - All other LCs for road not covered in above classes.   |
| D     | - for Cattle crossings.  |

38. What is clear visibility on LC?

At the approaches to all manned/unmanned LC where the view is clear on either side and on both direction for a distance of 600 m. is called clear visibility.

39. What is the criteria for manning an unmanned LC on accidents involved?

If any unmanned Level Crossing gets involved in more than Three accidents in Three years, it should be manned immediately irrespective of the category to which it belongs.

40. Explain types of roads regards to LC.

For the purpose of this standard, Roads shall be categorised as,

- (i) Class I Roads: NH, SH, Important roads in town and roads in and around towns where road and rail traffic is heavy.
- (ii) Class II Roads: Major and other District roads, Unimportant road inside the towns and other surface roads.
- (iii) Class III Roads : Earth roads, Cart tracks.
- (iv) Class IV Roads : Cattle crossings and Footpaths.

41. What is the revised priority for manning of unmanned LCs?

Category I – Clear visibility LCs where TVU > 6000 and road vehicles >180.

Category II – Restricted visibility LCs where TVU > 6000 and road vehicles > 120.

Category III - Restricted visibility LCs where TVU is between 3000–6000

42. Explain the process of conducting census of LC.

Periodical census of traffic at all LCs (manned & u/m) should be taken once in three years to review the classification, in case of manned LC and need for manning in the case of u/m LC. The total Train Vehicle Units and Total Road Vehicles units were noted down for a week and round the clock.

TVU can be calculated by multiplying Train units/day with Road vehicle/day.

Train, Motor vehicle and Bullock Cart are being considered as one unit, Cycle Rickshaw and Auto Rickshaw being considered as 0.5 units.

43. Draw a not to scale sketch with required dimensions of a level crossing with all required infrastructure including the safety precaution arrangements.

44. What are the points to be considered while planning of Railway Staff Colonies?

45. What are all the different pipe materials used for conveyance of water from source and explain?

46. What are the different types of survey to be conducted for new line and explain in detailed?

47. How will you categories of line on BG in Indian Railway and briefly explain each?
48. What are the different types of estimates and explain any three in detailed?
49. What are the important aspects & principle to be observed during acquiring land?
50. What are the records to be maintained in Divisional office and Chief Engineer's office?
51. Write short notes on the following:
  - a) Steps to control the unauthorized use of Rly land
  - b) Categories of encroachment
52. Write short notes on the following:
  - a) Verification of land boundaries
  - b) Lease and licence
53. a) Define danger mark in bridge b) Define actual HFL and designed HFL
54. Define free board, Vertical clearance, Afflux and how to calculate afflux?
55. How to determine the vent way of a bridge?
56. a) What is Q50?
  - b) How to calculate the scour depth in bridges?
57. Workout the BCI for the given data. Assume any data if required.

**BULDING COST INDEX FOR THR YEAR 1999-2000 FOR ONE CITY**

| Sl.No | Description           | Unit             | Delhi rate<br>as on 1.1.70 | Local<br>Rates | % of<br>Weightage |
|-------|-----------------------|------------------|----------------------------|----------------|-------------------|
| 1.    | Stock Bricks          | 1000 Nos         | 54.00                      | 1733.33        | 16.00             |
| 2.    | River Sand            | 1 m <sup>3</sup> | 14.17                      | 310.77         | 05.00             |
| 3.    | Aggregate 40mm & 20mm | 1 m <sup>3</sup> | 16.47                      | 441.44         | 06.50             |
| 4.    | Timber                | 1 m <sup>3</sup> | 892.96                     | 47628.28       | 18.00             |
| 5.    | Cement                | 1 Q              | 21.21                      | 340.00         | 21.00             |
| 6.    | Steel                 | 1 Q              | 89.03                      | 1800.00        | 10.00             |
| 7.    | Mason                 | 1Each            | 06.77                      | 160.00         | 08.50             |
| 8.    | Carpenter             | 1Each            | 06.77                      | 150.00         | 04.00             |
| 9.    | Mazdoor               | 1Each            | 03.00                      | 100.00         | 11.00             |

BCI for the year 1999-2000 for the city =

58. a) What is the need of doing chlorination?
  - b) How to assess the chlorine demand of water?
  - c) What is meant by break point chlorination?
  - d) What is meant by residual chlorine and what is recommended limits?
59. Describe the different materials used for chlorination and explain.
60. Draw a neat sketch of GLR and OHT with full details in parts.
61. Design a septic tank for a colony of 200 staff quarters and draw a neat sketch?

62. Write short notes on the following:

- a) Manhole
- b) Ventilating column
- c) Self cleaning velocity
- d)

63. Write short notes on the following:

- a) Dispersion trench
- b) Contact beds
- c) Soak pit
- d) Bio-latrine
- e) Cleaning of storage water tanks.
- f)

65. a) What are all the different pipe materials used for conveyance of water from source?

b) How will you maintain a sewerage system?

66. How will you lay and joint the sewer pipes?

67. How will you determine the capacity of OHT/GLR?