



# KD Campus Pvt. Ltd

2007, OUTRAM LINES, 1ST FLOOR, OPPOSITE MUKHERJEE NAGAR POLICE STATION, DELHI-110009

## Answer-key & Solution

SSC JE (Civil)  
MOCK -(104)  
Date 01/7/2017

1. A	26. B	51. B	76. D	101. A	126. B	151. A	176. B
2. D	27. D	52. A	77. D	102. A	127. A	152. C	177. A
3. C	28. A	53. B	78. A	103. C	128. B	153. A	178. D
4. B	29. B	54. B	79. B	104. D	129. A	154. A	179. B
5. D	30. C	55. A	80. C	105. A	130. D	155. D	180. C
6. C	31. D	56. C	81. D	106. A	131. A	156. A	181. C
7. C	32. A	57. C	82. B	107. A	132. B	157. B	182. B
8. B	33. D	58. D	83. C	108. A	133. C	158. A	183. B
9. D	34. B	59. A	84. A	109. B	134. C	159. C	184. A
10. B	35. C	60. D	85. A	110. A	135. B	160. D	185. D
11. B	36. B	61. B	86. B	111. B	136. B	161. B	186. A
12. B	37. B	62. C	87. A	112. B	137. C	162. B	187. D
13. A	38. B	63. A	88. D	113. B	138. A	163. D	188. D
14. A	39. C	64. C	89. C	114. A	139. C	164. D	189. D
15. B	40. C	65. D	90. C	115. C	140. A	165. D	190. C
16. C	41. C	66. D	91. B	116. D	141. A	166. C	191. A
17. B	42. B	67. A	92. A	117. C	142. C	167. C	192. A
18. A	43. D	68. D	93. B	118. B	143. A	168. D	193. B
19. A	44. A	69. B	94. A	119. A	144. C	169. D	194. B
20. A	45. D	70. D	95. D	120. C	145. D	170. A	195. C
21. C	46. A	71. B	96. D	121. B	146. D	171. C	196. C
22. D	47. B	72. C	97. D	122. D	147. C	172. D	197. C
23. B	48. C	73. B	98. C	123. C	148. A	173. B	198. B
24. B	49. B	74. D	99. C	124. C	149. C	174. D	199. A
25. B	50. B	75. C	100. D	125. C	150. B	175. C	200. C

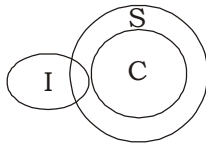
**Note :** If your opinion differ regarding any answer, please message the mock test and Question number to 9560620353

**Note :** If you face any problem regarding result or marks scored, please contact : 9313111777

**SOLUTION SSC JE (Civil) MOCK TEST no. 104**

1. (A) 2<sup>nd</sup> October is celebrated as Gandhi's birthday and 14<sup>th</sup> November is celebrated as **Nehru's** birthday.
2. (D)  $6 \times 2 \times 3 = 36 \Rightarrow 36 \times 1.5 = 54$   
 $2 \times 8 \times 4 = 64 \Rightarrow 64 \times 1.5 = 96$
3. (C) Ben stokes represents **England** cricket team and Ashish Nehra represents Indian cricket team.
4. (B)  $18 \div 2 = 9 \Rightarrow 9 \times 9 \times 9 = 729$   
 $14 \div 2 = 7 \Rightarrow 7 \times 7 \times 7 = 343$
5. (D) Except **406**, others are completely divisible by 17.
6. (C) Except **Guwahati**, others are capital cities.
7. (C) Except **Dream**, others are reality.
8. (B) Only **Kidney** is an Internal organ.
9. (D) Number of boys in the row  
 $= (18 + 6 + 5) = 29$   
Anil is just left of Arun. So, Anil is 17<sup>th</sup> from the left end.  
Number of boys to the right of Anil  
 $= (29 - 17) = 12$   
So, Anil is **13<sup>th</sup>** from the right end of the row.

10. (B)



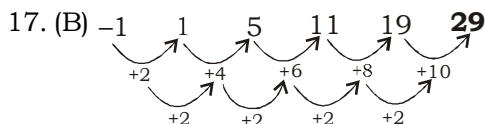
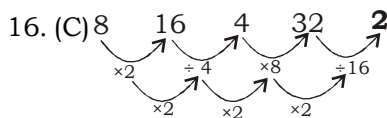
1. False 2. True

Only conclusion (2) follows

11. (B)  $12 \times 8 = 6 \times 16$ ,  $14 \times 5 = 10 \times 7$ ,  $18 \times 9 = 27 \times 6$
12. (B)  $87 = 29 + 58 = 13 + 22 + 52 = 17 + 29 + 6 + 35$
13. (A) LCM (12,8) = 24  
LCM (8,6) = 24  
LCM (6,4) = 12  
LCM (4,10) = 20  
LCM (10,15) = 30  
LCM (15,12) = **60**

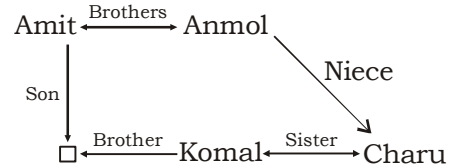
14. (A)

15. (B) **NATIVE**



18. (A) Continuous prime number has been used by considering three digits at a time in given pattern.  
2 3 5, 3 5 7, 5 7 1 1, 1 1 1 3 1 7  
235/357/571/171/113/111/**317**

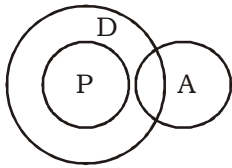
19. (A)



Clearly, Charu is Anmol's **Niece**.

20. (A) abcd/ebcd/afcd/abgd/abch
21. (C) After changing the sign, we have  
 $= 18 - 16 \div 4 + 2 \times 5$   
 $= 18 - 4 + 10$   
 $= 24$
22. (D)
23. (B)  $18 \div 6 - 1 \times 2 = 3 - 2 = 1$
24. (B)
25. (B) 68 86 41 34  
R I D E
26. (B) We celebrate children's day on 14<sup>th</sup> November and Teacher's day on **5<sup>th</sup> September**.
27. (D)  $2 \times 3 \times 7 = 42 \Rightarrow 42 \times 2.5 = 105$   
 $3 \times 8 \times 2 = 48 \Rightarrow 48 \times 2.5 = 120$
28. (A) C A N O M O P R  
+2 | +3 | +5 | +4 | +2 | +3 | +5 | +4 |  
↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓  
E D S S O R U V
29. (B) Tokyo is the Capital of Japan and Rangoon is the capital of **Burma**.
30. (C) Except **April**, other months have 31 days
31. (D) Except **twitter**, others are search engine.
32. (A) Except **M**, others have same water image.
33. (D) Except **530**, others are product of two continuous natural numbers.
34. (B)  $8 = 2 \times 2 \times 2$  (a cube number)  
Four years ago  
 $8 - 4 = 4 = 2 \times 2$  (Square of the same whole number)  
Next perfect cube number  
 $27 = 3 \times 3 \times 3$   
 $\therefore 27 - 8 = 19$  years  
So, he should wait for another **19** years.

35. (C) 1. True 2. False



36. (B)  $V \times X - I = 5 \times 10 - 1 = 49$   
 $IV \times IX - V = 4 \times 9 - 5 = 31$   
 $VI \times V - II = 6 \times 5 - 2 = \mathbf{28}$   
 $IX \times X - V = 9 \times 10 - 5 = 85$

37. (B) 
$$\begin{array}{r} 5 \quad \mathbf{4} \quad 7 \quad 8 \\ + 2 \quad 8 \quad 6 \quad 7 \\ \hline 8 \quad 3 \quad \mathbf{4} \quad 5 \end{array}$$

38. (B)  $12 \times 3 = 9 \times 4$   
 $16 \times 5 = 8 \times 10$   
 $12 \times 9 = 6 \times \mathbf{18}$

39. (C)

40. (C) - 10 triangles

- 8 triangles

- 6 triangles

$\therefore$  Total number of triangles =  $10 + 8 + 6 = 24$

41. (C) 
$$\begin{array}{ccccccc} 12 & & 4 & & 4 & & 7 & & 18 & & \mathbf{77} \\ & \swarrow & \nearrow & \swarrow & \nearrow & \swarrow & \nearrow & \swarrow & \nearrow & \swarrow & \nearrow \\ & \times 0.25 + 1 & & \times 0.5 + 2 & & \times 1 + 3 & & \times 2 + 4 & & \times 4 + 5 & \end{array}$$

42. (B) II, III, V, VII, XI, XIII, **XVII**  
 2 3 5 7 11 13, 17  
 (Continuous Prime numbers)

43. (D) 
$$\begin{array}{ccccccc} 18 & & 10 & & 12 & & 27 & & \mathbf{112} \\ & \swarrow & \nearrow & \swarrow & \nearrow & \swarrow & \nearrow & \swarrow & \nearrow \\ & \times 0.5 + 1 & & \times 1 + 2 & & \times 2 + 3 & & \times 4 + 4 & \end{array}$$

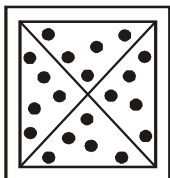
44. (A)

	Vowel	Consonant	Result	Reverse
BABY	1	3	$13^2 = 169$	961
BABU	2	2	$22^2 = 484$	484
ANT	1	2	$12^2 = 144$	441
THREE	2	3	$23^2 = 529$	<b>925</b>

45. (D) cabd/abd/bd/cabd/abd

46. (A)  $24 \times 5 - 8 \div 2 + 9$   
 $= 24 \times 5 - 4 + 9$   
 $= 120 - 4 + 9$   
 $= \mathbf{125}$

47. (B)



48. (C) L.H.S =  $24 + 18 \div 3 - 4 \times 5$   
 $= 24 + 6 - 4 \times 5$   
 $= 24 + 6 - 20$   
 $= 30 - 20$

= 10 = R.H.S

49. (B)

50. (B) 34, 14, 59, 77

C A P E

51. (B) Manganiyars are a tribal community from Rajasthan (North West) with a strong musical tradition. The Manganiyars consider themselves descendants of the Rajputs and are renowned as highly skilled folk musicians of the Thar desert. Their songs are passed on from generation to generation as a form of oral history of the desert. They sing songs about Alexander the Great, about the local Maharajas and past battles in the region.

52. (A) Aristotle in 340 B.C first stated that the earth was spherical in his book "On the Heaven". Ancient Greek philosopher Aristotle was born in 384 B.C. in Stagira, Greece. When he turned 17, he enrolled in Plato's Academy. In 338, he began tutoring Alexander the Great. In 335, Aristotle founded his own school, the Lyceum, in Athens, where he spent most of the rest of his life studying, teaching and writing. Aristotle died in 322 B.C.

53. (B) The Constitution (98th Amendment) Bill, 2003, seeks to constitute a National Judicial Commission (NJC) by including Chapter IV-A in Part V of the Constitution which will be in charge of appointing judges to the higher judiciary and for transferring High Court Judges.

55. (A) It is observed that a liquid drop tends to contract and appear spherical when it is set free from external forces like gravity, etc. Surface tension is the property among liquids due to which they tend to occupy minimum surface area. That's why water droplet appears spherical because for a given volume, a sphere has minimum surface area. Due to this property of surface tension liquid surface stretches and behaves like a stretched membrane.

56. (C) Cobalt-60 is useful as a gamma ray source because it can be produced in predictable quantity and high activity by bombarding cobalt with neutrons. This is commonly used in radiation therapy for treatment of cancer.

57. (C) During a transplant, the fine roots are destroyed due to the jostling during the uprooting process. These root hairs come under a shock. The plant which has been transplanted either takes time to read just

- to the new soil or dries up and dies due to the root hair loss.
59. (A) The first edition of Gramin Khel Mahotsav (GKM) will be held from March 25th to 31st, 2017 in New Delhi. The games will be held in five sports disciplines Athletics, Kabaddi, Kho-Kho, Volley Ball and Wrestling. The festival will help participation of rural youth in large numbers in popular sports and encourage them to achieve excellence and adopt healthy life style. The purpose of this fest is to promote sports in rural areas across the country and will be replicated in other States and UTs as well.
60. (D) Food and Nutrition Board works under Ministry of Women and Child Development. It is a technical support wing under Child Development Bureau of the Ministry. None of the given options is correct.
61. (B) These Bhakti saints were disciples of Saint Ramananda.
62. (C) The Cardamom Hills are southern hills of India and part of the south Western Ghats located in south-east Kerala and south-west Tamil Nadu. They are not in Coromandel Coast. Kaimur Range is the eastern portion of the Vindhya Range extending from Madhya Pradesh to Bihar. They are not in Konkan coast. The Mahadeo Hills are in Madhya Pradesh, Central India. Mikir hills are in Assam i.e. in North East India.
63. (A) Sabeer Bhatia of India and Jack Smith founded the first free web-based email service, Hotmail, in 1995. Hotmail was commercially launched on 4<sup>th</sup> July 1996 as "HoTMaiL" on American Independence Day.
65. (D) In case of motor car battery or automotive batteries a nominal 12-volt potential difference is provided by connecting six galvanic cells in series. Capacity of these batteries is expressed in ampere hour. Electrolyte used is a solution of about 35% sulphuric acid and 65% water and electrodes used are plates of lead and separate plates of lead dioxide.
66. (D) Nitroglycerine (NG) also known as nitroglycerine, trinitroglycerin (TNG), nitro, trinitroglycerine, glyceryl trinitrate (GTN), or 1,2,3- trinitroxypropane, is a heavy, colorless, oily, explosive liquid obtained by nitrating glycerol. Alfred Nobel discovered that mixing nitroglycerin with diatomaceous earth would turn the liquid into a paste, called dynamite. An advantage of dynamite was that it could be cylinder-shaped for insertion into the drilling holes used for mining.
67. (A) Diatoms are autotrophs which prepare their own food. Crustaceans are herbivorous animals which feed on diatoms. Herrings are carnivorous animals which feed on Crustaceans. This completes the food chain.
68. (D) Justice Abhay Manohar Sapre has been appointed the new chairman of Cauvery Water Disputes Tribunal (CWDT). The post fell vacant following the resignation of Justice Balbir Singh Chauhan, who is currently the chairman of Law Commission. The CWDT was constituted by the Government of India (GoI) in 1990 to adjudicate the water dispute regarding the inter-state Cauvery river which has Tamil Nadu, Karnataka, Kerala and Puducherry as basin states.
69. (B) The British Govt. sent a delegation to India under Sir Stafford Cripps, to negotiate with the Indian National Congress a deal to obtain total cooperation during the war, in return of progressive devolution and distribution of power from the Crown and the Viceroy to an elected Indian Legislature. The talks failed, as they did not address the key demand of a time table of self government and of definition of the powers to be relinquished, essentially making an offer of limited dominion status that was wholly unacceptable to the Indian movement.
70. (D) Production of rice is 96.43 MT, wheat is 78.4 MT, pulses are 15.11 MT and coarse cereals are 40.73 MT in India. So, the correct sequence in decreasing order is Rice – Wheat – Coarse cereals – Pulses.
71. (B) The salaries and allowances of the Judges of the HC are charged to the Consolidated Fund of the state but their pensions are payable as Charged Expenditure /Art 112(3).
74. (D) DNA finger printing technology is the process of establishing the biological paternal relationship between individual and his alleged child on the analysis of sample cells taken from each of them. DNA finger printing can solve cases of rape murder etc.
75. (C) According to the annual report of International Monetary Fund, India's GDP growth has been projected to 6.6% in FY 17 due to the strains that have emerged in the economy as a result of temporary disruptions caused by demonetisation. It expects growth to rebound to 7.2% in FY18.

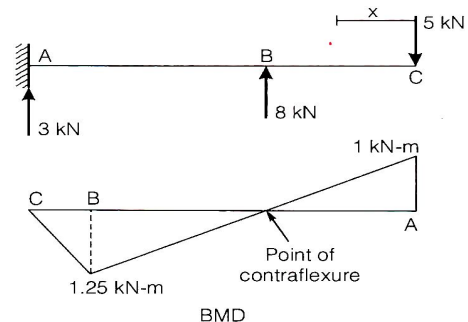
77. (D) Geologists believe that the Indian peninsula was a part of the Gondwana land (continent) which drifted northwards and India, Africa and other parts separated from each other.
78. (A) We measure economic freedom based on 12 quantitative and qualitative factors, grouped into four broad categories, or pillars, of economic freedom:
- Rule of Law (property rights, government integrity, judicial effectiveness)
  - Government Size (government spending, tax burden, fiscal health)
  - Regulatory Efficiency (business freedom, labour freedom, monetary freedom)
  - Open Markets (trade freedom, investment freedom, financial freedom)
79. (B) PM resigns, if he loses the majority in the house is a convention which is not mentioned in the constitution. Conventions are unwritten practices which are binding on the three organs of the State. Unlike the President, the Prime Minister does not have a fixed tenure. The full term of the Prime Minister is five years, which coincides with the normal life of the Lok Sabha. However, the term can end sooner if he loses the vote of confidence in the Lower House. So, it can be said that he remains in power as long as he enjoys the confidence of the Lok Sabha. The Prime Minister can also resign by writing to the President. There is no term limits on the office of the Prime Minister. There is also no official retirement age.
80. (C) A fuse is a type of alloy to protect an electric protection device. It is placed in the main circuit. It melts when too much current flows. Short circuit, overload or device failure is often the reason for excessive current. The high resistance of the element used in fuse generates heat due to the excessive current flow. It has low melting point so that it melts when overloading takes place thereby saving the other wires from getting damaged.
81. (D) Crookes glass is a type of glass that contains Cerium and other rare earths and has a high absorption of ultraviolet radiation used in sunglasses.
- Soda glass: Soda-lime glass, also called soda-lime-silica glass, is the most prevalent type of glass, used for window panes and glass containers (bottles and jars) for beverages, food, and some items.
  - Pyrex glass: Pyrex is a brand introduced by Corning Inc. in 1908 for a line of clear, low-thermal-expansion borosilicate glass used for laboratory glassware and kitchenware.
  - Jena glass: glass of fine quality especially suited for chemical and optical ware and other scientific and industrial applications.
82. (B) Pitcher plant is an insectivorous plant. It feeds on living creatures including insects and small mammals. This plant attracts the prey with a smell of rotting meat. The victim is dissolved by some chemical enzymes.
83. (C) Mumbai has been named as the richest Indian city with a total wealth of \$820 billion, according to recently released New World Wealth report. It is home to 46,000 millionaires and 28 billionaires, and is followed in terms of wealth by Delhi, Bengaluru, Hyderabad and Pune. Delhi is home to 23,000 millionaires and 18 billionaires with a total wealth of \$450 billion, while Bengaluru with a total wealth of \$ 320 billion houses 7,700 millionaires and 8 billionaires. Hyderabad is home to 9,000 millionaires and 6 billionaires.
84. (A) Gopal Baglay, the 1992-batch officer of the Indian Foreign Service (IFS), has been appointed as the new spokesperson of the Ministry of External Affairs (MEA). Earlier, he headed the division of the MEA dealing with Pakistan. He has also served as the Deputy High Commissioner to Islamabad. Baglay replaced Vikas Swarup, who is headed to Canada as envoy.
85. (A) Dennis Hayes and Dale Heatherington released the 80-103A Modem in 1977. The Modem and their subsequent modems become a popular choice for home users to connect to the Internet and get online.
87. (A) The important crop of Barak valley is jute, because it is situated in Assam. The temperature of the valley varies from 25° to

30°C and rainfall varies from 100 to 200 cm, which is ideal for jute cultivation.

89. (C) Oath or affirmation by the President under article 60; Oath or affirmation by Judge of SC, Members of Parliament, Ministers for the Union comes under Third Schedule of the Constitution.
90. (C) Ball bearings are used to reduce friction. Friction is directly proportional to effective surface area. So if effective surface area is reduced then friction will also reduce.
91. (B) The lightest metal in the periodic table is lithium (Li) with atomic number 3 density 0.53 kg/L. Lithium metal is extremely soft (and highly reactive) and so is unusable for many applications. Osmium is a hard metallic element which has the greatest density of all known elements. It is twice as heavy as lead, and has a specific gravity of 22.59.
92. (A) Deficiency of vitamin C causes Scurvy, disease of gums. Deficiency of vitamin D causes Rickets, a disease of bones and Deficiency of Vitamin A causes night blindness, a disease of eyes.
93. (B) Ankur Mittal has won silver in men's double trap at the International Shooting Sport Federation (ISSF) World Cup at the Karni Singh Shooting Range in New Delhi. Beside this, in the mixed team 10m air pistol event, the Indian pair of Heena Sidhu and Jitu Rai won the 'gold badge'.
94. (A) Textile Labour Association which is normally known as TLA Ahmadabad was founded by Mahatma Gandhi in the year of 1920. After Mahatma return from South Africa in 1915 he decided to live permanently in India and for that he viewed many places and in the last he chose Ahmadabad in Gujarat for his satyagrah ashram. The main reason for choosing Ahmadabad was Textile Mills. Ahmadabad was known as a Manchester of India where most of the cotton Mills were situated.
95. (D) The approximate representation of land use is classified as net area sown. 46%, forests 23%, other areas 30%.
97. (D) Section C of the Forest Dwellers Act provides a transparent three step procedure for deciding on who gets rights.

Firstly, the Gram Sabha makes a recommendation i.e, who has been cultivating land for how long, which minor forest produce is collected etc. The Gram Sabha plays this role because it is a public body where all people participate and hence is fully democratic and transparent. The Gram Sabha's recommendation goes through two stages of screening committees- the Taluka and the District levels.

98. (C) The compound Zinc Oxide (ZnO) is called philosopher's wool. Alchemists, as part of their rituals, would burn Zinc in air and collect the residue, which formed into white woolly tufts. They called it Lana philosophica in Latin, meaning philosopher's wool. Zinc Oxide has many uses: as white pigment in paints, component in Zinc ointment for treating skin diseases, material in sun screens and sun lotions, in rubber manufacturing and in photo-copying products.
99. (C) Parathyroid hormone is secreted from parathyroid gland. This hormone regulates Calcium and Phosphate level in blood. Parathyroid hormone raises the level of Calcium in the blood and decreases the level of Phosphorous in the blood.
100. (D) Zootopia, directed by Byron Howard and Rich Moore, has won the Best Animated Feature Film at the 89th Oscar Academy Awards at the Dolby Theatre in Los Angeles, California. The film details the unlikely partnership between a rabbit police officer and a red fox con artist as they uncover a conspiracy which involves the disappearance of predator inhabitants of a mammalian metropolis.
101. (A) The point where BM is zero changes sign, is called point of contraflexure.

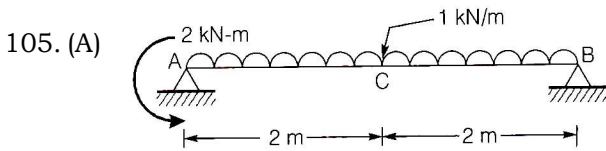


Distance of point of contraflexure from A is  $x$ ,  $5(1-x) - 8(0.75-x) = 0$   
 $x = 0.333$  m

102. (A) Vertical reaction,  $R = 120$  kN  
 The centroid of the load is at 1m from the support and therefore the moment = Load  $\times$  centroid distance from support  
 Moment =  $120 \times 1 = 120$  kN-m

104. (D) Let the reaction at B be  $V_B$  upwards.  
 Taking moments about A, we get  
 $V_B \times 4 - 4 - 4 \times 2 + 4 = 0$   
 $\Rightarrow V_B = 2$  kN (upwards)

Bending moment at C is given by  
 $M_C = V_B \times 2 - 4 = 2 \times 2 - 4 = 0$



The reaction at end A

$$\Rightarrow R_A \times 4 = 1 \times 4 \times 2 + 2$$

$$\Rightarrow R_A = 2.5$$
 kN

$\therefore$  BM at mid-span C is  
 $M_C = 2.5 \times 2 - 1 \times 2 \times 1 - 2$   
 $= 1$  kNm (sagging)

107. (A) Efficiency of riveted joint,

$$\eta = \frac{\text{Strength of riveted joint}}{\text{Strength of solid plate}} \times 100$$

The section 1-1 is most critical.

The strength of joint at section 1-1 is  $(b-d)t\sigma_{at}$ .

The strength of solid plate is  $b t \sigma_{at}$ .

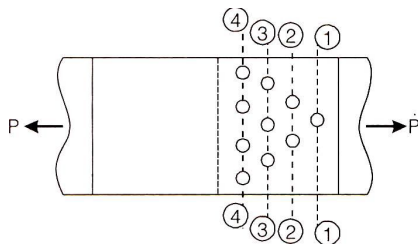
$$\text{So } \eta = \frac{b-d}{b} \times 100$$

108. (A) The maximum size of a fillet weld is obtained by subtracting 1.5 mm from the thickness of the thinner member to be jointed. This specification limits the size of the fillet weld so that total strength may be developed without overstressing the adjacent metal.

114. (A) Maximum permissible slenderness ratio = 180

$$\therefore \text{Unbraced length} = 180 \times 20 = 3600 \text{ mm} = 3.6 \text{ m}$$

115. (C) Load carried by lacing = 2.5% of axial load.



$$= \frac{2.5}{100} \times 125 = 3.125N$$

124. (C) From first statement when both end

$$\text{fixed } \frac{l}{2} = L \quad \dots 1$$

from second statements one end hinged

$$\frac{l}{2} = ? \quad \dots 2$$

equation 1 and 2

$$l = 1.41L$$

138. (A)  $U = 50\%$

$$t = \frac{\pi}{4}(u)^2$$

$$= \frac{\pi}{4} \times \left(\frac{50}{100}\right)^2$$

$$= 0.2$$

165. (D)  $m = 7.5$  kg

$$v = 0.01$$
 m<sup>3</sup>

$$w = \frac{mg}{v} = \frac{7.5}{0.01} \times 10 = 0.750$$

167. (C)  $\frac{h_1}{h_2} = \frac{d_2}{d_1}$

$$\frac{30}{x} = \frac{1}{0.2} =$$

$$x = 15$$

188. (D) Cement requer to prepare 100m<sup>3</sup> of 1 : 2 : 4.

$$\text{Cement} = \frac{152}{1+2+4} = \frac{152}{7} \approx 21m^3$$

192.  $E = 2G(1 + \mu)$

$$E = 2G(1 + 0.2)$$

$$\frac{E}{4} = 2.4$$

193. (B)  $l = 2m$

$$w = 5\text{kg/m}$$

U.D.L load for simply supported

$$\text{slope} = \frac{wl^3}{24EI}$$

$$= \frac{5 \times 2^3}{24EI} = \frac{5}{3}EI$$

194. (B)  $\tau_{\max} = \frac{16T}{\pi D^3} \quad \dots 1$

$$\frac{M}{I} = \frac{f}{y}$$

$$f = m^2 = \frac{T}{2} \times \frac{\pi D^3}{32} \quad \dots 2$$

equation 1 and 2

$$\frac{f}{\tau_{\max}} = \frac{16T}{\pi D^3} = 4$$

$$\frac{T}{2} \times \frac{\pi D^3}{32}$$

195.(C) When both and fixed

$$F_1 = \frac{\pi^2 EI}{\left(\frac{l}{2}\right)^2} = \frac{4\pi^2 EI}{l^2} \quad \dots 1$$

when one end free

$$F_2 = \frac{\pi^2 EI}{4l^2}$$

$$= \frac{1}{16} \frac{4\pi^2 EI}{l^2} \quad \dots 2$$

equation 1 and 2

$$F_2 = \frac{1}{16} \times F_1$$

197. (C)  $\mu = 0.25$   
 $E = 3K (1-2\mu)$

$$\frac{E}{k} = 3 (1 - 2 \times 0.25)$$

$$E = 1.5K$$