Answer-key & Solution

SSC JE (Mechanical)
MOCK -(84)
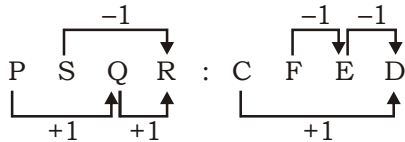*Date 04.02.2017*

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

Note : *If your opinion differ regarding any answer, please message the mock test and Question number to 9560620353*
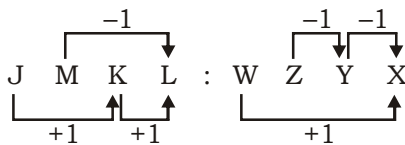
Note : *If you face any problem regarding result or marks scored, please contact : 9313111777*

SOLUTION SSC JE (Mechanical) MOCK TEST no. 84

1. (D) As,

$$P \quad S \quad Q \quad R \; : \; C \quad F \quad E \quad D$$

with -1, -1, -1 transformations above and $+1$, $+1$, $+1$ below.

Similarly,

$$J \quad M \quad K \quad L \; : \; W \quad Z \quad Y \quad X$$

with -1, -1, -1 above and $+1$, $+1$, $+1$ below.

2. (A) As, $61 = (4)^3 - 3$
   $121 = (5)^3 - 4$
   and $337 = (7)^3 - 6$
   Therefore, $? = (6)^3 - 5 = 211$

3. (D) As Wick is a part of Candle, similarly Wheel is a part of Bicycle.

4. (C) All except Sword strike the target from a distance.

5. (C) All except ROAD have only one vowel.
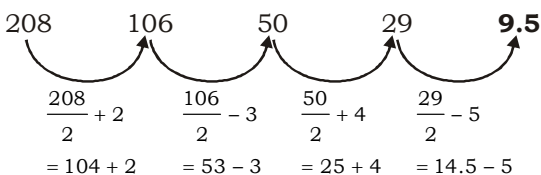
6. (B) All except Hammer have a pointed end.

7. (D)

Chapter ← circle → Book, Page
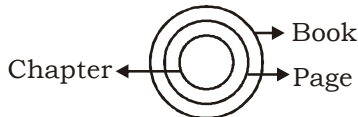
8. (B) $3 \times 1 + 2 = 5$ (V)
   $5 \times 2 + 3 = 13$ (XIII)
   $13 \times 3 + 4 = 43$ (XXXXIII)
   $43 \times 4 + 5 = 177$ (CLXXVII)

9. (A)

   208 → 106 → 50 → 29 → **9.5**

   $\dfrac{208}{2} + 2$ $\dfrac{106}{2} - 3$ $\dfrac{50}{2} + 4$ $\dfrac{29}{2} - 5$

   $= 104 + 2$ $= 53 - 3$ $= 25 + 4$ $= 14.5 - 5$

10. (C) Given words are arranged as per their order in english alphabet from right to left.

11. (B) $\dfrac{12 \times 9}{27} = 4$ $\dfrac{28 \times 16}{14} = 32$

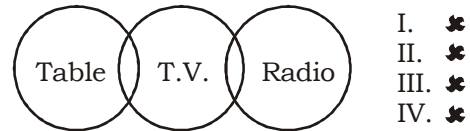 $\dfrac{18 \times 12}{36} = 6$ $\dfrac{57 \times 32}{48} = \mathbf{38}$

12. (B) LCM (36, 12, 48) = 144
    LCM (16, 24, 32) = 96
    LCM (96, 36, 24) = **288**

14. (B) Q part of the figure represents those girls who are players but not coach.

15. (D)

    Table — T.V. — Radio
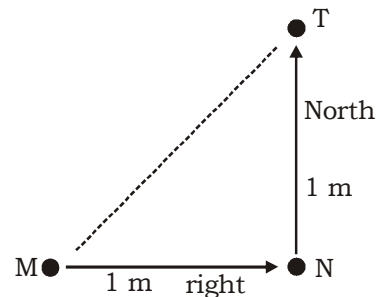
    I. ✗
    II. ✗
    III. ✗
    IV. ✗

16. (C) B is the son of A, C is the wife of B, D is C's sister and E husband. So, C is the sister in law of E.

17. (B) According to M # N $ T

    T is North-East of M (M at origin, N is 1 m right of M, T is 1 m North of N).

    Hence T is in the North-East of M.

18. (C) Suppose their paths cross after x minutes.
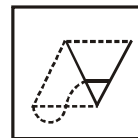   Then, $11 + 57x = 51 - 63x \Leftrightarrow 120x = 40$

    $\Leftrightarrow x = \dfrac{1}{3}$ min

    Number of floors covered by David in $\dfrac{1}{3}$ min.

    $= \left(\dfrac{1}{3} \times 57\right) = 19$ floors
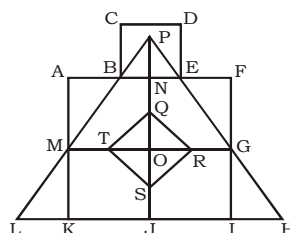
    So, their paths cross at (11 + 19)th i.e. 30th floor.

19. (D)

20. (B)

	B	A	L	E	C	A	R	T	O	Y
Position	2	1	12	5	3	1	18	20	15	25
Position + 1	3	2	13	6	4	2	19	21	16	26
(Position +1)²	9	4	169	36	16	4	361	441	256	676

24. (A)

Triangles :

Simple triangles are BPN, PNE, ABM, EFG, MLK, GHI, QRO, RSO, STO and QTO i.e. 10 in number.

Triangles composed of two components each are BPE, TQR, QRS, RST and STQ i.e. 5 in number.

Triangles composed of three components each are MPO and GPO i.e. 2 in number.

Triangles composed of six components each are LPJ, HPJ and MPG i.e. 3 in number.

There is only one triangle LPH composed of twelve components.

Total number of triangles in the figure = 10 + 5 + 2 + 3 + 1 = 21.

Squares :

Squares composed of two components each are KJOM and JIGQ i.e. 2 in number.

Squares composed of three components each are ANOM, NFGO and CDEB i.e.3 in number.

There is only one square i.e. QRST composed of four components.

There is only one square i.e. AFIK composed of ten components.

Total number of squares in the figure = 2 + 3 + 1 + 1 = 7.

25. (B) From positions X and Y we conclude that 1, 5, 6 and 3 lie adjacent to 4. Therefore, 2 must lie opposite 4. From positions Y and Z we conclude that 4, 3, 2 and 5 lie adjacent to 6. Therefore, 1 must lie opposite 6. Thus, 2 lies opposite 4, 1 lies opposite 6 and consequently 5 lies opposite 3.

As analysed above, the number on the face opposite 4 is 2. In position Y, since 4 lies on the top, therefore 2 must lie at the bottom face.

27. (C) $78 \Rightarrow 7 \times 8 = 56 \Rightarrow 56 + (5 + 6) = 56 + 11 = 67$

$82 \Rightarrow 8 \times 2 = 16 \Rightarrow 16 + (1 + 6) = 16 + 7 = 23$

28. (C)

29. (C)
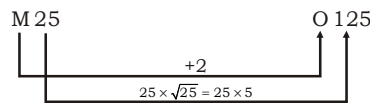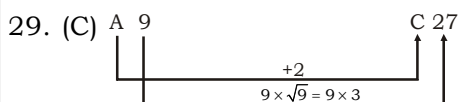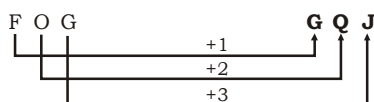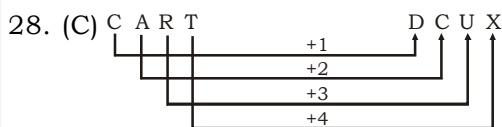
30. (C) All except litchi have multiple seeds.

31. (A) $64 = 4^3$, $16 = 4^2$, $36 = 6^2$, $144 = 12^2$

Only (64) is the no. whose cubic root is possible.

32. (D) $4^3 + 5^3 = 64 + 125 = 189$

$5^3 + 6^3 = 125 + 216 = 341$

$6^3 + 7^3 = 216 + 343 = 559$

$3^3 + 6^3 = 27 + 216 = 243$

Except (243), rest are the sum of the cubes of consecutive numbers.

33. (D) All except Trousers are garments which cover the upper part of the body.

34. (C) In all other figures, double sided arrows intersect each other at right angles.

35. (C) Some doctors may be professors and vice-versa.

Some professors may be men and vice-versa.

Some doctors may be men and vice-versa.

Some doctors may be men and professors as well.

36. (C) Let the number of pineapples and watermelons be x and y respectively.

Then, $7x + 5y = 38$ or $5y = (38 - 7x)$ or

$$y = \frac{38 - 7x}{5}$$

Clearly, y is a whole number, only when $(38 - 7x)$ is divisible by 5.

This happens when $x = 4$.

37. (C) Madhav is the only son of one of the sons of Varman's father → Either Varman is the father or uncle of Madhav.

38. (C)
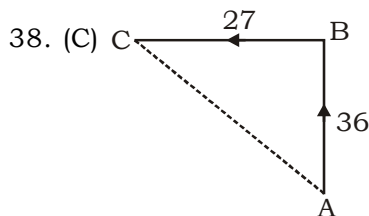
Required distance

$AC = \sqrt{27^2 + 36^2}$

$= \sqrt{729 + 1296}$

$= \sqrt{2025}$

$= 45$ km

39. (A) Road $\Rightarrow$ n (Road) = 4

$\Rightarrow 4! = 4 \times 3 \times 2 5 1 = 24$

You $\Rightarrow$ n (You) = 3

$\Rightarrow$ 3! = 3 × 2 × 1 = 6

Go $\Rightarrow$ n (Go) = 2

$\Rightarrow$ 2! = 2 × 1 = 2

Young $\Rightarrow$ n (Young) = 5

$\Rightarrow$ 5! = 5 × 4 × 3 × 2 × 1 = 120

40. (C)

Calculators

Scales   I. ✘

II. ✔

III. ✘

Phones   IV. ✔
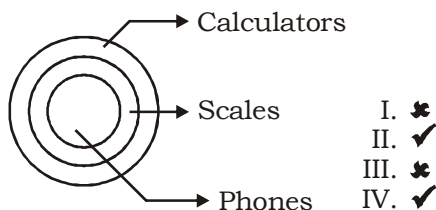
Only (II) and (IV) follow.

41. (C) Only one statement is true, either first or second.

43. (C) $4^3 - 7^2 = 64 - 49 = 15$

$5^3 - 9^2 = 125 - 81 = 44$

$3^3 - 4^2 = 27 - 16 = 11$

44. (C) $16 + \dfrac{16}{2} = 24,$ $24 + \dfrac{24}{2} = 36$

$36 + \dfrac{36}{2} = 54,$ $54 + \dfrac{54}{2} = 81$

$81 + \dfrac{81}{2} = 81 + 40.5 = 121.5$

$121.5 + \dfrac{121.5}{2} = 121.5 + 60.75 = 182.25$

45. (D) From figures X and Y, we conclude that dot, circle, square and cross lie adjacent to the triangle. Therefore, the arrow must lie opposite to triangle. From figures X and Z, we conclude that dot, triangle, arrow and cross lie adjacent to the circle. Therefore, the square must lie opposite to circle. Thus, the arrow lies opposite to triangle, the square lies opposite to circle and consequently, the cross lies opposite to dot.

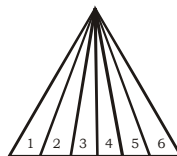As analysed above, the cross lies opposite the dot.

47. (D)
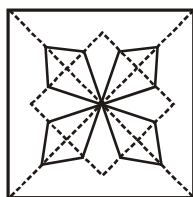
48. (C) aa/b **b** b/cc **c** c/ **a** aa/b **b** bb/c **c** c **c** c

49. (C) $4^{2010} = 4^{3 \times 670}$ mod 7

$= 1^{670}$ mod 7

So, it will be next to friday i.e, saturday after 4^{2010} days.

50. (C)

1 2 3 4 5 6

Here, n = 6

So, required no. of Δ's = $\dfrac{6 \times 7}{2}$ = 21

51. (C) The Indian Constitution was adopted by the Constituent Assembly on the 26th November, 1949 and it came into force after two months on 26th January, 1950. The day January 26th was chosen because it was on this very day when the Poorna Swaraj resolution was made in Lahore in 1930 and the first tricolor of India unfurled.

52. (C) Some of the dynasties that ruled Magadha were: Haryanka Kingdom (684-424 BC); Shishunaga Kingdom (413-345 BC); Nanda Empire (424-321 BC); and Maurya Empire (321-184 BC).

53. (B) Shaktikanta Das, an Economic affairs secretary, has represented India at the 2016 South Asian Association for Regional Cooperation (SAARC) Finance ministers' conference on 25-26th August at Islamabad, Pakistan.

55. (A) Article 14 of the constitution guarantees that all citizens shall be equally protected by the laws of the country. It means that the State cannot discriminate any of the Indian citizens on the basis of their caste, creed, colour, sex, gender, religion or place of birth.

57. (B) A merchant bank is a financial institution which provides capital to companies in the form of share ownership instead of loans. It is a bank that deals mostly in (but is not limited to) international finance, long-term loans for companies and underwriting. Merchant banks do not provide regular banking services to the general public.

62. (D) When a piece of paper and a cricket ball are dropped from the same height, they reach the surface at different time because the shape of the paper is more flat and it behaves like a parachute causing more air resistance acting on it with respect to the ball. But, in order to reach the surface at the same time by both the articles, they must be dropped in vacuum. It is because

in vacuum there is no other force other than force of gravity occurring on them and this leads to a conclusion that both the article reaches at the same time.

63. (D) The taste buds for sweet are on the tip of the tounge. The 'salt' taste buds are on the either side of the front of the tounge. The 'sour' taste buds are behind this and 'bitter' taste buds are way in the back.

64. (A) Raisina Hill is an area of Lutyens Delhi, New Delhi, housing India's most important government buildings, including Rashtrapati Bhavan, the official residence of the President of India and the Secretariat building housing the Prime Minister's Office and several other important ministries. It is surrounded by other important buildings and structures, including the Parliament of India, Rajpath, Vijay Chowk and India Gate.

65. (C) This is a method is described whereby, using primitive equipment anyone can measure the size of the earth to an accuracy of order of magnitude 10% by observing two sunsets in the space of a few seconds.

66. (B) Lead-potash lime glass is flint glass. It has high refractive index and is used in making prisms lens etc. It is a soft glass.

67. (D) Rock salt is another name given to "Sodium Chlorides ores".

69. (A) The 4th edition of Mother Teresa International Film Festival (MTIFF) 2016 started in Kolkata, West Bengal on August 26. The 4-day-long movie carnival at the state-run Nandan multiplex screened a selection of 23 best foreign and Indian films ever made on or inspired by Teresa. It is organized by the Archdiocese of Kolkata, Missionaries of Charity and SIGNIS India (Indian chapter of World Catholic Association for Communication). The Roman Catholic nun Mother Teresa, who passed away in 1997 after serving the poor and sick on the streets of Kolkata for 45 years, will be declared a saint by Pope Francis in the Vatican City on September 2016.

70. (A) An ashrama in Hinduism has four stages in an age-based social system as laid out in the Manu Smriti and later Classical Sanskrit texts. These stages are: Brahmachari (student), Grihasta (Householder), Vanaprastha (forest dweller or Hermit in semi retirement age) and Sannyasi (the renounced one in full retirement age). The Ashram system is believed by the Hindus

to lead to a fulfillment of the four aims of life namely, Dharma (righteousness), Artha (wealth), Kama (pleasure) and Moksha (liberation).

71. (A) Because aluminium with oxygen forms a thin layer of Aluminium Oxide which is tough and protects aluminium objects from further corrosion.

73. (B) Karnataka will host the 15th edition of Pravasi Bharatiya Divas (PBD) 2017 in Bengaluru for 3 days from January 7th, 2017. The theme of 2017 PBD is "Redefined Engagement With Indian Diaspora". The PBD convention is held on January 9th each year to commemorate the return of Mahatma Gandhi from South Africa in 1915. It is celebrated to mark the contribution of the overseas Indian community to the development of the country.

76. (B) Mustard gas is "Dichloro Diethye sulphide"; its vapours produced blisters on skin and damages lungs.

78. (A) India has recently signed an agreement with Egypt in the area of Maritime Transport in New Delhi to step up co-operation on the seas. The agreement will strengthen cooperation and provide sustained mutual assistance and advice on merchant shipping and other related maritime matters. It was signed during the 3-day visit of Egyptian President Abdel Fattah El Sisi to India on September 1-3, 2016. This is the first presidential visit to Egypt from India since the visit of then President Mohamed Morsi in 2013.

79. (D) The book "Munnu: A Boy from Kashmir" has been authored by Malik Sajad. This book is a poignant, heart-stopping account of what it means to be a young boy growing up in a conflict-ridden land.

80. (A) Article 222 empowers the President to transfer judges from one High Court to another. Clause (2) of this article goes on to provide that when a judge is transferred he shall be entitled to receive a compensatory allowance in addition to his salary. It is felt that there is no real justification for granting such an allowance and it is accordingly proposed to omit clause.

81. (B) Anuradha Rao has been appointed as the new MD and CEO of SBI Mutual Fund. Prior to this appointment, Rao was the Deputy Managing Director at SBI handling New Business Portfolio. She succeeded

Dinesh Kumar Khara, who has been appointed Managing Director of State Bank of India (Associate & Subsidiaries).

86. (D) The Indian Space Research Organization (ISRO) will launch the INSAT-3DR satellite into orbit by the GSLV-F05 rocket vehicle from the Satish Dhawan Space Centre at Sriharikotta, Andhra Pradesh. The INSAT-3DR is a modern weather satellite and has a mission duration of 8 years. It will help to predict weather patterns and also provide search and rescue information.

87. (C) A basic microscope is made up of two converging lenses. The first lens creates a real image which serves as the object for the second lens, and the image created by the second lens is the one a viewer sees. The final image is magnified, virtual and is inverted compared to the original object.

88. (A) Since the colour of red litmus paper remained red with no change, hence the given liquid is not base.

89. (A) Nearness to source of raw materials is one of the key factors that guide the establishment of such industries as iron, steel and other metal industries. Besides, they are also found near the coal mines which are used in smelting processes.

91. (D) Steel Authority of India Limited is one of the largest state-owned steel-making company based in New Delhi (India) and it is one of the top steel makers in World. Major plants owned by SAIL are located at Bhilai, Bokaro, Durgapur, Rourkela, Burnpur (near Asansol) and Salem.

94. (C) The Forty-second Amendment of the Constitution of India, enacted in 1976, brought about the most widespread changes to the Constitution until then. It is often called a "mini-Constitution" or the "Constitution of India".

97. (B) Seller's market is a market which has more buyers than sellers. High prices result from this excess of demand over supply. The opposite of the seller's market is the buyer's market, where supply greatly exceeds demand.

98. (B) The 52nd Constitutional Amendment of 1985 amended articles 101, 102, 190 and 191; and inserted Schedules 10 to the Constitution of India. It dealt with the Anti Defection Law and provided disqualification of members from parliament and assembly in case of defection from one party to other.

99. (D) Curzon introduced some reforms in agriculture. He passed the Punjab Land alienation Act of 1902. Under this act Curzon declared that the land of agriculture will not be transferred to non-agriculturist. In this way he protected the farmers from money lender class.

123. (C) d = 7 cm
L = 8 cm
r_c = 8

$$r_c = \left(\frac{V_s + V_c}{V_c} \right)$$

V_c = Sweft volume $= \frac{\pi}{4} D^2 \times L = 307.87 cm^2$

V_c = Clerance volume

$$8 = \frac{307.87 + V_c}{V_c} = 43.98 cm^3$$

128. (D) $(COP)_{HP} = \frac{Q_A}{W}$ we know that

$$5 = \frac{Q_A}{1}$$

Q_A = 5kw
$(COP)_{HP} - (COP)_R = 1$
$(COP)_{Ref} = 4$

$$(COP)_{Ref} = \frac{Q_R}{W}$$

$$4 = \frac{Q_R}{1}$$

Q_R = 4kw

129. (A) T_H = 283 + 273 = 556K
T_L = 5 + 273 = 278K
Q_A = 278kW
For reversible engine

$$\frac{Q_A}{T_H} = \frac{Q_R}{T_L}$$

Q_R = 139kW

133. (A) Degree of reaction

$$= \frac{\text{Enthalpy drop in moving blade}}{\text{Enthalpy drop in stage}}$$

Degree of reaction for impulse turbine = 0
Degree of reaction for reaction turbine = 1

143. (B) $h_f = \frac{4fLV^2}{2gD}$

$$\frac{P_1 - P_2}{\rho g} = \frac{4fLV^2}{2gD}$$

$$= \frac{4 \times 0.01 \times 4000 \times 2^2}{2 \times 9.81 \times .2}$$

$P_1 - P_2 = 5.503$

145.(C) In impulse turbine the pressure both side of blade. Because Total pressure drop occur in nozzle.

148.(B) Over all efficiency of turbine

$$(\eta_0) = \frac{P}{\left(\frac{\rho g Q H}{1000}\right)}$$

$$(\eta_0) = \frac{3000 \times 1000}{1000 \times 9.81 \times 75 \times 5} = 82\%$$

157.(C) $R_e = \dfrac{\rho v d}{\mu}$

$$R_e = \frac{Vd}{\upsilon}$$

$$2320 = \frac{V \times 20 \times 10^{-2}}{0.101 \times 10^{-4}}$$

V = 1.117 cm/sec

163.(D) A key whose thicknes h, length l and width b.
In key matrial shear stress σ_s and crushing stress σ_c is.
shear force = crushing force

$$\sigma_s \times l \times b = \sigma_c \times l \times h / 2$$

$$\sigma_s \times l \times b = 2 \times \sigma_S \times l \times h / 2$$

b = h

164.(C) $\text{Coil index} = \dfrac{\text{Average diameter of coil}}{\text{diameter of wire}}$

165.(C) Tearing efficiency of rivet = 35%
Diameter of riveted hole = (d)
Pitch interval of rivet = (p)
Tearing efficiency of rivet

$$= \frac{\text{Tearing strength of plate}}{\text{Strength of solid plate}}$$

$$\frac{35}{100} = \frac{(p-d) \times t \times f_t}{P \times t \times f_t}$$

$$\frac{d}{p} = 0.65$$

166.(A) $T_{max} = \sigma \times b \times t$
$100 = \sigma \times 10 \times 4$

$$\sigma = \frac{100}{10 \times 4}$$

$$\sigma = 2.5 N / cm^2$$

170.(B) Gear ratio $= \dfrac{D_G}{D_P} = 3$

$$\Rightarrow D_G = 3D_P$$

$$\frac{D_G}{2} + \frac{D_P}{2} = 200$$

$$\frac{3D_G}{2} + \frac{D_P}{2} = 200$$

$D_P = 200$
$D_P = 100$mm

Module $(m) = \dfrac{D_p}{T_p} = \dfrac{100}{20} = 5mm$

178.(D) P = 44 kw
N = 700 rps

$$P = \frac{2\pi NT}{60 \times 100} kw$$

$$\frac{44 \times 60 \times 100}{2\pi \times N \times T} \Rightarrow \frac{7 \times 44 \times 60 \times 1000}{2 \times 22 \times 700 \times 60}$$

T = 10N-m

179.(D) Number of link in slider crank mechanism = 4
Joints (J) = 4
DOF = 3 $(l - 1)$ −2J−h
DOF = 3(4−1) − 2 × 4 − 0
DOF = 1

182.(C) $e_{max} = (\varepsilon_1 - \varepsilon_2) = (1000 + 600) \times 10^{-6}$
$= 1600 \times 10^{-6}$

183.(D) $T_e = \sqrt{M^2 + T^2} = \sqrt{9 + 16} = 5kN.m$

188.(C) $T_e = \sqrt{M^2 + T^2}$
$25 = M^2 + 16$
M = 3 kN.m

196.(B) Polar section modulus

$$\left(Z_p\right) = \frac{I_P}{R}$$

$$= \frac{\dfrac{\pi d^4}{32}}{d / 2} = \frac{\pi d^3}{16}$$