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2007, OUTRAM LINES, 1ST FLOOR, NEAR GTB NAGAR METRO STATION, GATE NO. - 2, DELHI-110009

Answer-key & Solution

SSCJE (Mechanical)

MOCK -(76)

Date 10/12/2016

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

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

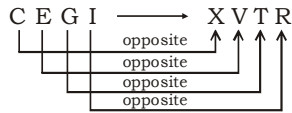
Note : *If you face any problem regarding result or marks scored, please contact : 9313111777*

of a child similarly, **writer** is responsible for the existence of a book.

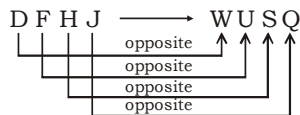
27. (A) $(2)^3 = 8 : (3)^2 = 9$

$(4)^3 = 64 : (5)^2 = 25$

28. (D) As,



Similarly,



29. (C) $(6 \times 6) - 1 = 35$

$(9 \times 6) - 1 = 53$

30. (A) 216 is a cube of even number whereas rest are cubes of odd number.

Example- $27 = (3)^3$, $125 = (5)^3$, **$216 = (6)^3$** , $343 = (7)^3$

31. (D) Sum of 1st three numbers results in the fourth whereas option (d) is not satisfying the same.

32. (A) We know that Red, Green and Blue are primary colours whereas Yellow is not a primary colour.

33. (C) Except option (C), In other options each letter is increased by 1.

34. (A) Unit → Tens → Hundreds → Thousands
 2 4 1 3
 → Lakhs
 5

35. (C) The letter 'R' of Pointer is missing in word DISAPPOINTMENT.

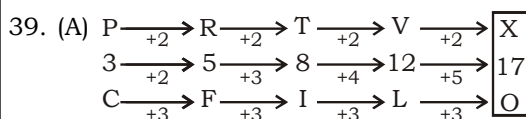
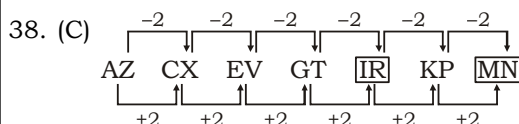
36. (D) $2486 - 85 = 2401$ is a perfect square of 49.

37. (D) $55 + 66$

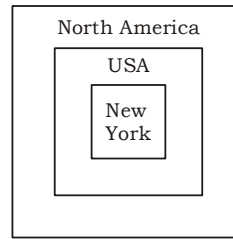
$\Rightarrow 5 + 5 + 6 + 6 = 22 \Rightarrow 22 \times \frac{3}{2} = 33$
 $22 + 99$

$\Rightarrow 2 + 2 + 9 + 9 = 22 \Rightarrow 22 \times \frac{3}{2} = 33$
 $44 + 88$

$\Rightarrow 4 + 4 + 8 + 8 = 24 \Rightarrow 24 \times \frac{3}{2} = 36$



40. (D)



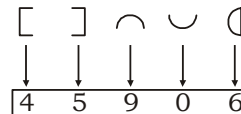
41. (C) As Ramesh and Amit are brothers. Also, Amit is the son of Sushma. So, Ramesh is also the son of Sushma.

42. (C) $24 * 2 * 4 * 3$

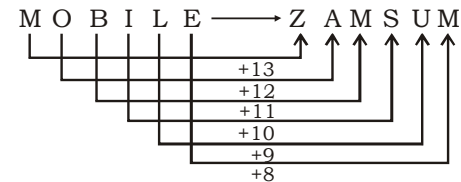
$\Rightarrow 24 \div 2 = 4 * 3$

$\Rightarrow 12 = 12$

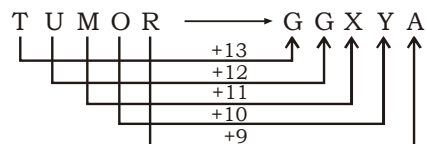
43. (B)



44. (A) As,



Similarly,



45. (A)

46. (B) a b b b / a b b b / a b b b

47. (D) $(3)^2 + (5)^2 + (1)^2 = 35$

$(4)^2 + (7)^2 + (2)^2 = 69$

$(6)^2 + (3)^2 + (7)^2 = 94$

48. (A)

49. (C)

50. (A)

55.(A) The Indian Councils Act 1909, commonly known as parliament of the United Kingdom that brought about a limited increase in the involvement of Indians in the governance of British India.

56.(C) The Public Accounts Committee (PAC) is a committee of selected members of Parliament, constituted by the Parliament of India for the auditing of the expenditure of the government of India. Its chief function is to examine the audit

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- report of Comptroller and Auditor General (CAG) after which it is laid in the Parliament CAG to assist the committee during the course in investigation. None of the 22 members shall be a minister in the government.
- 59.(B) The Constitution of India mentions certain conditions for a person to be eligible for being a judge of the Supreme court of India. In order to be appointed as a Judge of the Supreme Court, a person must be a citizen of India and must have been for at least five years, a Judge of a High Court or of two or more such Courts in succession, or an advocate of a high Court or of two or more such Courts in succession for at least 10 years or he must be a distinguished jurist in the opinion of the President.
- 61.(B) Mushroom cultivation has been found to coincide with decrease of incidents of breast cancer. Spent residues after cultivation could be a better source of biologically pre-treated substrates for biogas production and agricultural waste recycling can be achieved through controlled cultivation of mushrooms.
- 62.(D) The freezing point of water is the temperature at which water changes phase from a liquid to a solid. Under normal conditions, ordinary water freezes at 0°C or 32°F . The temperature may be lower if super cooling occurs or if there are impurities present in the water which could cause freezing point depression to occur.
- 64.(B) The Indian Tri-colour was first unfurled on 26 January, 1930 at Lahore, by Pandit Jawaharlal Nehru. It was on the same day that the Indian National Congress declared 26th January as Independence Day or as the day for Poorna Swaraj (Complete Independence) which occurred 20 years later.
- 66.(D) An artificial ecosystem is one that is created by people. You can create an artificial ecosystem in an aquarium or terrarium. Nathaniel Bagshaw Ward is credited as the inventor of the terrarium, which he accidentally created in 1829.
- 68.(A) Ozone layer serves as a protective shield against harmful solar ultraviolet radiation.
- 69.(A) Higher concentration of Nitrogen and Phosphorus causes Eutrophication.
- 72.(A) Dyarchy was introduced as a constitutional reform by Edwin Samuel Montagu (secretary of state for India, 1917-22) and Lord Chelmsford (Viceroy of India, 1916-21). It marked the first introduction of the democratic principle into the executive branch of the British administration of India. Though much criticized, it signified a breakthrough in British Indian government and was the forerunner of India's full provincial autonomy (1935) and independence (1947).
- 73.(B) United States is the third largest country in terms of population after China and India.
- 75.(D) Water vapour transpires constantly through pores (stomata) in the surface of plant's leaves.
- 76.(C) Vijay Stambh is an imposing structure located in Chittorgarh fort in Rajasthan which was constructed by Mewar king Rana Kumbha in 1442 AD to commemorate his victory over the combine armies of Malwa and Gujarat led by Mahmud Khilji.
- 78.(A) According to the Special Theory of Relativity, the mass of a moving object measures more as its velocity increases until, at the speed of light, it becomes infinite. This is because as an object gains speed, it gains more (kinetic) energy.
- 80.(A) The sewage obtained from water closets and urinals is known as Sanitary waste.
- 82.(C) The main source of carbon monoxide is transportation.
- 84.(C) Composite volcanoes are most commonly found in island arcs. Most of them are found scattered on the islands adjoining the Pacific Ring of Fire where about 75% of Earth's volcanoes are found. It is a region of high volcanic and seismic activity that surrounds the majority of the Pacific Ocean Basin.
- 88.(B) Marginal product of an input (factor of production) is the extra output that can be produced by using one more unit of the input (for instance, the difference in output when a firm's labour usage is increased from five to six units), assuming that the quantities of no other inputs to production change. Marginal product, which occasionally goes by the alias marginal physical product (MPP) is the one of the two measures derived from the total product. The other is average product. Marginal product is directly proportional to total product.

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- 89.(D) Work done by the string of the simple pendulum during one complete oscillation is zero. Tension in the string exactly cancels the component parallel to the string. This leaves a net restoring force back toward the equilibrium position as it is equal to zero.
- 90.(B) Gene is a segment of DNA in all living organisms.
- 91.(C) Capital markets provide for the buying and selling of long term debt or equity backed securities. When they work well, the capital markets channel the wealth of savers to those who can put it to long term productive use, such as companies or governments making long term investments. Capital Markets allow businesses to raise long-term funds by providing a market for securities, both through debt and equity. Capital markets offer a whole range of complicated products which allow businesses and banks not just to raise capital but also to 'hedge' (protect) against risks.
- 94.(B) India is called a mixed economy because there is both private owned enterprises and state owned enterprises and the government does not intervene on the decisions of enterprises owned by individuals except to govern law and to correct market failures. The product market in this case is determined by the market demand and market supply rather than the decisions of the policy makers.
- 97.(B) If the President is satisfied on the basis of the report of the Governor of the concerned state or from other sources that the governance in a state cannot be carried out according to the provisions in the Constitution, he/she can declare a state of emergency in the state. Such an emergency must be approved by the Parliament within a period of 2 months. Under Article 356 of the Indian Constitution, it can be imposed from six months to a maximum period of three years with repeated parliamentary approval after every six months.
- 99.(B) A strait is a narrow, typically navigable channel of water that connects two larger, navigable bodies of water. It commonly refers to a channel of water that lies between two land masses, but it may also refer to a navigable channel through a body of water that is otherwise not navigable, for example because it is too

shallow, or because it contains an un-navigable reef or archipelago.

$$102. (D) N = \frac{n(n-1)}{2} = \frac{10 \times 9}{2} = 45$$

105. (D) Velocity ratio

$$\frac{\text{Product of teeth on the driver}}{\text{Product of teeth on the follower}} = \frac{W_{\text{driver}}}{W_{\text{driven}}}$$

$$\text{Train value} = \frac{W_{\text{driver}}}{W_{\text{driven}}} = \frac{1}{VR}$$

106. (D) Two important properties of an involute
(i) A normal to an involute is a tangent to the base circle

(ii) The radius of curvature of an involute is equal to the length of the tangent to the base circle

109. (C) Circumferential stress = $r v^2$

$$25 \times 10^6 \text{ N/m}^2 = 1000 \times v^2$$

$$v^2 = \frac{25.2 \times 1000}{7}$$

$$v^2 = 3600$$

$$v = 60 \text{ m/sec}$$

110. (B) Function of flywheel is to control the speed variations caused by the fluctuation of the engine turning moment during each cycle of operation. It smoothen the turning moment on the shaft.

117. (D)

$$L = \left(\frac{C}{P}\right)^3 \quad [c = \text{constant}]$$

$$L_1 P_1^3 = L_2 P_2^3$$

$$L_1 (P)^3 = L_2 \left(\frac{P}{2}\right)^3$$

$$L_1 P^3 = \frac{L_2 P^3}{8}$$

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

$$= 2 \times 100 \times 1.25 = 250 \text{ GPa}$$

124. (D) $\sigma_1 = \sigma_2 = \frac{Pr}{2t} = \frac{pd}{4t}$

$$\sigma_1 = \sigma_2$$

$$\therefore \frac{pd}{4t} = 45$$

$$P = \frac{4 \times 1.5 \times 10^{-2} \times 45}{1.5} = 1.8 \text{ MPa}$$

125. (C)

- A. Bending moment is constant → Shear force is zero over the portion of the beam.

$$S = \frac{Dm}{dx} \quad M = \text{constant}, S = 0$$

- B. Bending moment is maximum or minimum → Shear force changes sign.
C. Bending moment is zero → Point of contraflexure.
D. Loading is constant → Slope of shear force diagram is zero over the portion of the beam.

129. (C) As cross section area is same

$$\frac{\pi}{4}(d_1^2 - d_2^2) = \frac{\pi}{4}d_s^2$$

$$d_1^2 - d_2^2 = d_s^2$$

Now torque \propto polar moment

$$\frac{T_h}{T_s} = \frac{\frac{\pi}{32}(d_1^4 - d_2^4)}{\frac{\pi}{32}(d_s^4)} = \frac{d_1^4 - d_2^4}{d_s^4}$$

$$\frac{T_h}{T_s} = \frac{d_1^2 + d_2^2}{d_s^2}$$

d_1 will be always greater than d_s for

the given condition, hence $\frac{T_h}{T_s} > 1$

131. (B) $\frac{\tau}{r} = \frac{T}{J}$

$$\tau = \frac{T}{J}r$$

134. (A) For hinged column

$$P = \frac{\pi^2}{l^2}El = 10kN$$

For fixed column

$$P = \frac{4\pi^2}{l^2}El = 4 \times 10 = 40kN$$

148. (B) Submerged Arc welding: the arc occurring between the electrode and the workpiece is completely submerged under the flux and not visible from outside. A part of the flux melts and forms the slag which covers the weld metal.

183. (B) $P_{\text{air}} = -0.25 \times 13.6 = -3.4$ m of water

Now, $P_{\text{air}} + 4 \times 0.8 = P_A$

$$\begin{aligned} \therefore P_A &= -3.4 + 3.2 \\ &= -0.2 \text{ m of water} \\ P_A &= -1.962 \text{ KPa} \end{aligned}$$

187. (C)

$$T = 2\pi\sqrt{\frac{K_G^2}{g \cdot GM}}$$

$$= 2\pi\sqrt{\frac{(9)^2}{9.81 \times 0.750}}$$

$$= 20.85 \text{ sec.}$$

192.(C)

$$\Rightarrow \frac{du}{dx} + \frac{dv}{dy} = 0$$

$$\Rightarrow \frac{d(Ae^x)}{dx} + \frac{dv}{dy} = 0$$

$$\Rightarrow Ae^x + \frac{dv}{dy} = 0$$

$$\Rightarrow v = -Ae^xy$$

194.(D)

$$Q = \frac{a_1 a_2}{\sqrt{a_1^2 - a_2^2}} \sqrt{2gh}$$

$$Q = \frac{5 \times 3}{\sqrt{5^2 - 3^2}} \times \sqrt{2 \times 981 \times 5}$$

$$= 370 \text{ cm}^3/\text{s}$$

199.(B) Unit speed of the turbine is given by

$$\frac{N}{\sqrt{H}} = 50$$

$$\Rightarrow \frac{400}{\sqrt{H}} = 50 \quad \Rightarrow H = 64 \text{ m}$$

200. (B) $B.P. = \frac{mgh}{R_m} = \frac{80 \times 9.81 \times 30}{0.8} = 29.4 \text{ kW}$

Correction MOCK TEST -(75)

139. B

$$\frac{1}{\eta_{HE}} = 1 + (COP)_R$$

$$5 = 1 + (COP)_R$$

$$(COP)_R = 4$$