



# KD Campus Pvt. Ltd

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

## Answer-key & Solution

SSC JE (Mechanical)  
MOCK -(138)  
Date:- 5.5.2018

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

**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. 138**

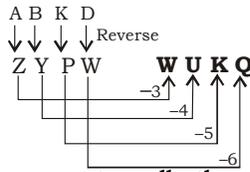
1. (A) Dogs bark and goats bleat.
2. (C) As, PALAM  
 $16 + 1 + 12 + 1 + 13 = 43$   
 Similarly,  
 STRUCTURE =  $19 + 20 + 18 + 21 + 3 + 20 + 21 + 18 + 5$   
 $= 145$
3. (D) As,  $\frac{(8)^3}{2} = 256$   
 Similarly,  $\frac{(12)^3}{2} = 864$
4. (B) As, PEN =  $16 + 5 + 14 \Rightarrow (35)^2 = 1225$   
 Similarly,  
 SOLUTION =  $19 + 15 + 12 + 21 + 20 + 9 + 15 + 14$   
 $\Rightarrow (125)^2 = 15625$
5. (A) Except **River**, all contain stagnant water.
6. (D) Except **493**, all are multiple of 19.
7. (D)  $1^3 - 1 = 0$   
 $3^3 - 1 = 26$   
 $8^3 - 1 = 511$   
 $7^3 + 1 = 344$
8. (C) The day after 1335 days =  $\frac{1335}{7}$   
 $= 190 \text{ Week} + 5 \text{ Days}$   
 $\therefore$  The Required Day = Monday + 5 Days  
 $= \text{Saturday}$
9. (B) 'Pi' means 'good' [From sentence I and III]  
 'ni' means 'These' [From sentence I and III]  
 and  
 Required word = 'co' means 'are'
10. (A) Satang  $\rightarrow$  Statia  $\rightarrow$  **Static**  $\rightarrow$  Statil  $\rightarrow$  Station
11. (C) Required Angle =  $\frac{11}{2} \times 36 - 30 \times 4 = 78^\circ$
12. (C)  $\begin{matrix} 6 & 7 & 16 & 51 & 204 & 1025 \\ \uparrow & \uparrow & \uparrow & \uparrow & \uparrow & \uparrow \\ \times 1+1 & \times 2+2 & \times 3+3 & \times 4+4 & \times 5+5 \end{matrix}$
13. (C)  $27648 \div 4^4 = 108$   
 $108 \div 3^3 = 4$   
 $4 \div 2^2 = 1$   
 $1 \div 1^1 = 1$
14. (D)  $(31-1) \times 0 + (31-1) \div 2 = 15$   
 $(15-1) \times 1 + (15-1) \div 2 = 21$   
 $(21-1) \times 2 + (21-1) \div 2 = 50$   
 $(50-1) \times 3 + (50-1) \div 2 = 171.5$   
 $(171.5-1) \times 4 + (171.5-1) \div 2 = 767.25$
15. (A)
 

$\oplus S$	← Son	$Q \oplus$
↑		↑
Nephew		Husband
←		←
$\ominus P$	← Sister	$R \ominus$

16. (C)  $16 - 12 + 3 \times 12 \div 48 = 16$   
 After interchanging the sign as the given details  
 $16 - 12 \div 3 \times 12 + 48 = 16$   
 $16 - 4 \times 12 + 48 = 16$   
 $16 - 48 + 48 = 16$   
 $16 = 16$
17. (A)  $12 \times 5 + 5 = 65$   
 Reverse the digit of the number = 56  
 $12 \times 2 + 5 = 29$   
 Reverse the digit of the number = 92  
 $14 \times 5 + 10 = 80$   
 Reverse the digit of the number = 08
18. (B)  $9 \times 3 - 3^2 = 18$   
 $6 \times 4 - 4^2 = 8$   
 $5 \times 3 - 4^2 = -1$
19. (A)  $\begin{matrix} 4 & 8 & 7 \\ +3 & 7 & 5 \\ \hline 8 & 6 & 2 \end{matrix}$
20. (D) **F E E D B A C K**  
 $\downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$   
**6 5 7 4 2 1 3 8**
21. (A)
22. (D)  $16 + 8 - 12 \div 4 \times 8$   
 Change the sign as per the given details  
 $16 \div 8 \times 12 - 4 + 8 = 28$
26. (B) As, the headquarters of World Bank is in Washington. Similarly, the headquarters of International Monetary Fund is in **Washington**.
27. (D) As,  $\begin{matrix} 26 & 65 \\ \downarrow & \downarrow \\ 5^2+1 & (5+3)^2+1 \end{matrix}$   
 Similarly,  $\begin{matrix} 170 & 257 \\ \downarrow & \downarrow \\ 13^2+1 & (13+3)^2+1 \end{matrix}$
28. (D) As,
 

I	L	O	R
↓	↓	↓	Reverse
R	O	L	I
-3	-4	-5	-6
O	K	G	C

Similarly,



29. (C) **Thailand** is a country, all others are Capital.

30. (C)  $9^2 - 2 = 79$

$$13^2 - 2 = 167$$

$$17^2 - 1 = 288$$

$$15^2 - 2 = 223$$

31. (A) Except CPA, all others have vowel in middle.

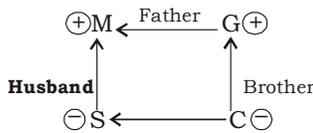
32. (C) Admin → Adminiculum → **Administer** → Administracion → Admissible.

33. (D) acbd cadb acbd ca db

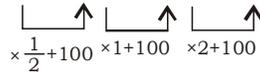
34. (B) ATQ,

$$\text{Required average age} = \frac{44 - 8}{2} = \mathbf{18 \text{ years}}$$

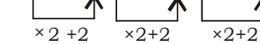
35. (B)



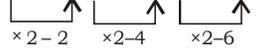
36. (D) 1000 600 700 **1500**



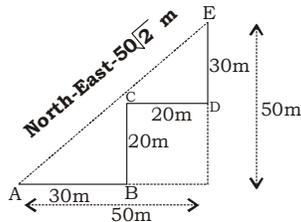
37. (C) 1.125 4.25 10.5 **23**



38. (D) 9 16 28 **50**



39. (C)



40. (C)

41. (D)  $5 \times 4 + (5 + 4) = 29$

$$6 \times 7 + (6 + 7) = 55$$

$$9 \times 8 + (9 + 8) = \mathbf{89}$$

42. (D) B → 2, I → 9 ⇒ 2 × 9 = 18 → R

C → 3, D → 4 ⇒ 3 × 4 = 12 → L

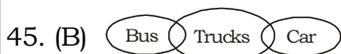
$$K = 11, B = 2 \Rightarrow 11 \times 2 = \mathbf{V}$$

43. (C)  $(86 - 38) \times 5 = 240$

$$(72 - 21) \times 5 = 255$$

$$(36 - 12) \times 5 = \mathbf{120}$$

44. (D)



I. False

II. False

51. (B) Amazon is the greatest river in the world by so many measures; the volume of

water it carries to the sea (approximately 20% of all the freshwater discharge into the oceans), the area of land that drains into it, and its length and width. It is one of the longest rivers in the world.

52. (D) The Vijaya Bank will set up 100 digital villages in various States of the country as part of its initiative to promote digital banking among the rural population. It is the only public sector financial institution to develop digital villages with focus on rural areas and it has already developed five villages including the one in Guntur district. In those villages, the bank will provide Internet, free Wi-Fi connectivity, mobile payment facilities, ATM cards, online banking and others besides educating the villagers through door-to-door campaign. The bank will also open bank accounts to all the eligible villagers including children and encourage them to make transactions digitally.

53. (A) BRICS is the acronym for an association of five major emerging national economies: Brazil, Russia, India, China and South Africa. Originally the first four were grouped as "BRIC", before the induction of South Africa in 2010. The BRICS members are all leading developing or newly industrialized countries.

54. (C) "Public interest Litigation", in simple words, means litigation filed in a court of law, for the protection of "Public Interest", such as Pollution, Terrorism, Road safety, Constructional hazards etc. Any matter where the interest of public at large is affected can be redressed by filing a Public Interest Litigation in a court of law.

56. (B) Human Rights Day is observed every year on 10<sup>th</sup> December. It commemorates the day on which, the United Nations General Assembly adopted the Universal Declaration of Human Rights. In 1950, the Assembly passed resolution 423 (V), inviting all States and interested organizations to observe 10<sup>th</sup> December of each year as Human Rights Day.

57. (D) Sankalp is a pilot project, launched by the Employees' State Insurance Corporation (ESIC) in collaboration with the Hindustan

- Latex Family Planning Promotion Trust, to prevent fresh HIV positive cases among members of the ESIC in the State through awareness camps.
58. (B) Mixed melting point is considered to be the best criteria for purity of a substance. The purified sample is mixed with a small quantity of pure compound and melting point of mixture is determined. If melting point of mixture is same as that of the pure compound, the sample compound is pure, otherwise it requires further purification.
59. (A) Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on site observation. Remote sensing is used in numerous fields, including geography and most Earth Science disciplines.
60. (A) The Antikythera mechanism is an ancient analogue computer and orrery used to predict astronomical positions and eclipses for calendrical and astrological purposes, as well as the Olympiads, the cycles of the ancient Olympic Games.
61. (B) Alauddin Khilji was a militarist and imperialist to the core. He was very ambitious. Alauddin, whose original name was Ali Gurshap, assumed the title Sikandar-i-Sani (Alexander the Second) and proclaimed Delhi as Dar-ul-Khilafa (Seat of the Caliphate).
62. (A) Kaziranga National Park is the name to exemplify the most popular conservation efforts to save the endangered species like one-horned rhinoceros in India. Located in the Golaghat and Nagaon district of Assam, this most notable wildlife sanctuary is being declared as a World Heritage Site by UNESCO in the year 1985. The park resides at an edge of the Eastern Himalayan biodiversity hotspot and this could be the perfect reason to envision high degrees of diversified species with great visibility.
64. (B) Each kidney is made up of about a million filtering units called nephrons. Each nephron filters a small amount of blood. The nephron includes a filter, called the glomerulus and a tubule. The nephrons work through a two-step process.
65. (C) Edson Arantes do Nascimento known as Pele is a retired Brazilian professional footballer who played as a forward. Pele has also been known for connecting the phrase "The Beautiful Game" with football.
67. (B) The International Development Association (IDA) is an international financial institution which offers concessional loans and grants to the world's poorest developing countries. The IDA is a member of the World Bank Group and is headquartered in Washington, D.C., United States.
68. (A) Nepal has recently signed a financing agreement with China Gezhouba Group Corporation (CGGC) to build 1,200-megawatt Budhi-Gandaki hydroelectric project. The estimated cost of the project is \$2.5 billion. This project will be helpful for Nepal, which is facing acute power shortage.
72. (D) Mumps is a relatively mild short term viral infection of the salivary glands that usually occurs during childhood. The salivary glands are also called the parotid glands; therefore, mumps is some times referred to as an inflammation of the parotid glands (epidemic parotitis).
74. (D) Taxes on tooth paste come under GST which is administered by State government. Sales tax is paid to sales tax authority in the state from where the goods are moved.
75. (A) Wajid Ali Shah was the tenth and last Nawab of Awadh, holding the position for 9 years, from February 13, 1847 to February 11, 1856. He was the Nawab when Awadh merged into British Empire.
76. (B) Palghat Gap is a low mountain pass connecting the states of Kerala and Tamil Nadu in India. The gap, at an elevation of 140 m, is the lowest pass and only gap in the 1600 km long stretch of Western Ghats.
77. (B) David Grossman has become the first Israeli author to win the 2017 Man Booker International prize for his novel "A Horse Walks into a Bar". The novel was translated by Jessica Cohen and is published in Britain by Jonathan Cape. To be considered for the prize, books had to be translated into English and published

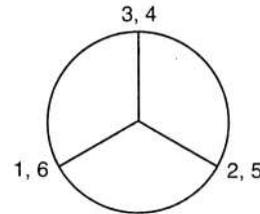
- in the UK between May 1, 2016 and April 30, 2017.
78. (A) Because of some ambiguity in laws and basic structure of the Constitution, Sir Ivor Jennings called it "Paradise of lawyers". But most of the lawmakers around the world disagree to such categorization.
79. (B) The Central Statistics Office (CSO), under the Ministry of Statistics and Programme Implementation, is responsible for macroeconomic data gathering and statistical record keeping. Its processes involve conducting an annual survey of industries and compilation of various indexes like the Index of Industrial Production (IIP), Consumer Price Index (CPI), etc.
80. (C) Dr. Neeru Chadha has become the first Indian woman to be elected as the judge of the International Tribunal for the Law of the Sea (ITLOS) for a nine-year term from 2017 to 2026. She got most of the votes in Asia Pacific Group. With this election, Dr. Chadha has also become the first Indian woman to occupy a top UN position, after Vijaya Lakshmi Pandit, who served as the President of the United Nations General Assembly (UNGA). The Hamburg-based ITLOS, established in 1996, is one of dispute settlement mechanisms under the UN Convention on the Law of the Sea (UNCLOS) that entered into force in 1994.
81. (C) The book titled "Nathuram Godse -The Story of an Assassin" authored by Anup Ashok Sardesai has been released on the death anniversary of Mahatma Gandhi on January 30, 2016.
82. (D) All of the options are the ways to conserve our water resources.
83. (A) Bleaching powder is prepared on the large scale by Hasen Clever process. The plant consists of a number of iron cylinders in which chlorine is brought in contact with slaked lime  $[Ca(OH)_2]$ .
85. (D) The Telangana government has launched Pashu Bazar website for online cattle sale. The online sale or purchase of cattle through pashubazar.telangana.gov.in website will help farmers as the cattle need not be brought to shandies every time and farmers can save on transportation cost on cattle. Farmer can keep maximum five registrations for sale at any time.
86. (B) The 'Black Hole' event was sensationalized by Holwell. Black Hole of Calcutta, scene of an incident on June 20, 1756, in which a number of Europeans were imprisoned in Calcutta (now Kolkata) and many died. The Europeans were the remaining defenders of Calcutta following the capture of the city by nawab Siraj al-Dawlah, of Bengal, and the surrender of the East India Company's garrison under the self-proclaimed governor of Bengal, John Z. Holwell. The incident became a cause célèbre in the idealization of British imperialism in India and a subject of controversy.
87. (B) Garba is a folk dance among the following dances in India. Garba is a form of dance which was originated in the state of Gujarat in India. The name is derived from the Sanskrit term Garbha and Deep. Many traditional garbas are performed around a centrally lit lamp or a picture or statue of the Goddess Shakti. Kathakali Manipuri and Mohiniyattam are classical dance of India.
88. (A) A writ of Mandamus can be issued by a judge at a petitioner's request when the authority of a higher court is needed to compel an action by an individual person, a government agency, or a lower court to do something they are legally required to do.
89. (B) Fructose is the sweetest sugar. Fructose, or fruit sugar, is a simple ketone monosaccharide found in many plants, where it often bonds to glucose to form the disaccharide sucrose.
91. (C) The net charge of the ionic compound is zero. It is composed of one ion of calcium with a positive two charge and two ions of fluorine with a negative one charge on each. The charges cancel out, leaving the compound with no net charge. The chemical formula for calcium fluoride is  $CaF_2$ . It is a crystalline solid that is commonly found in a mineral called fluorite or fluorspar.
93. (B) The three state-run Oil Marketing Companies (OMCs) - Indian Oil Corporation (IOC), Hindustan Petroleum

Corp Ltd (HPCL) and Bharat Petroleum Corp Ltd (BPCL) have signed an agreement to jointly set up the world's largest refinery and petrochemical complex at Ratnagiri district of Maharashtra at a cost of \$40 billion. The IOC will hold 50% stake and HPCL & BPCL will take 25% stake each in the new complex. The refinery will produce petrol, diesel, LPG, ATF and feedstock for making petrochemical that are basic building blocks in plastic, chemical and textile industries. The refinery is expected to be completed by 2022.

94. (C) In 1812, the Pindaris plundered the districts of Mirzapur and Shahabad and in 1815 they raided the Nizam's dominions. In 1816, they plundered the Northern Circars. Lord Hastings determined to suppress the Pindaris. For this he gathered a large army of 1,13,000 men and 300 guns and attacked the Pindaris from four sides. He himself took command of the force from the north while Sir Thomas Hislop commanded the force from the south. By 1818, the Pindaris were completely suppressed and all their bands disintegrated. Karim Khan was given a small estate in the Gorakhpur district of the United Provinces. Wasil Muhammad took refuge in the Scindia's camp but the latter handed him over to the British.
97. (C) Radius of a capillary tube is inversely proportional to the height of the liquid column. So, if radius of the tube is doubled, rise of level of water will become half of the previous rise in capillary tube.
98. (B) Ethylene is a rather stable molecule that polymerizes only upon contact with catalysts. The conversion is highly exothermic, that releases a lot of heat. Coordination polymerization is the most pervasive technology, which means that metal chlorides or metal oxides are used. The most common catalysts consist of titanium (III) chloride. Ethylene can be produced through radical polymerization, but this route is only limited utility and typically requires high pressure apparatus.

100. (A) The Battle of Ten Kings was fought on the bank of river Parushni. According to the sources, the reason behind the war was the rivalry between Vishwamitra and Vasishtha.

108. (B) In a six cylinder engine, the firing interval is  $720/6 = 120^\circ$  and the corresponding spacing of cranks is shown in the adjoining figure.



117. (D)  $v_c = 2\text{m/s}$   
 $t_1 = 0.5\text{ mm}$   
 $t_2 = 0.6\text{ mm}$

$$\text{chip thickness ratio } r = \frac{t_1}{t_2} = \frac{0.5}{0.6}$$

$$r = 0.83$$

$$v_f = r \cdot v_c$$

$$= 0.833 \times 2$$

$$v_f = 1.667\text{m/s}$$

118. (D)  $V_c = \pi D N$   
 $= \pi \times 40 \times 10^{-3} \times 300$   
 $= 37.69\text{m/min}$

and  $T = 120\text{ min}$

According to Taylor principle

$$V_c T^n = C$$

$$37.69 \times 120^{1/7} = C$$

$$C = 74.70$$

120. (C)  $\alpha = 16.8^\circ$   
 $\phi = 22.8^\circ$

According to Merchant's principle

$$2\phi + \beta - \alpha = 90^\circ$$

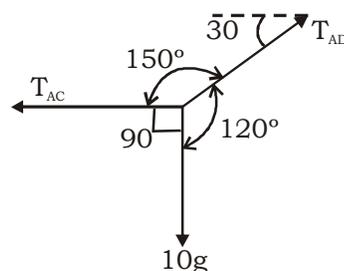
$$\beta = 90 + \alpha - 2\phi$$

$$= 90 + 16.8^\circ - 2 \times 22.8$$

$$= 106.8 - 45.6$$

$$\beta = 61.2^\circ$$

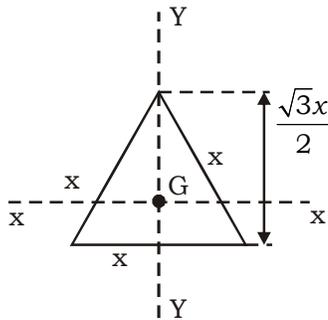
122. (C)



$$\frac{T_{AC}}{\sin 120^\circ} = \frac{10g}{\sin 150^\circ} = \frac{T_{AD}}{\sin 90^\circ}$$

$$\begin{aligned} T_{AC} &= 10g \cdot \frac{\sin 120^\circ}{\sin 150^\circ} \\ &= 10 \times g \times \frac{\sqrt{3}}{2} \times 2 \\ &= 169.91 \text{ N} \end{aligned}$$

126.(B)



$$I_P = I_{xx} + I_{yy}$$

$$I_P = \frac{x \left( \frac{\sqrt{3}x}{2} \right)^3}{36} + \frac{\left( \frac{\sqrt{3}x}{2} \right) x^3}{48}$$

$$I_P = \frac{3\sqrt{3}x^4}{36 \times 8} + \frac{\sqrt{3}x^4}{96}$$

$$= \frac{2\sqrt{3}x^4}{96}$$

$$I_P = \frac{x^4}{16\sqrt{3}}$$

129.(C)  $\sigma_c = \frac{P.d}{2t}$

$$= \frac{10 \times 200}{2 \times 5} = 200 \text{ N/mm}^2$$

$$\sigma_a = \frac{\sigma_c}{2} = 100 \text{ N/mm}^2$$

$$\tau_{\max} = \left\{ \left( \frac{200}{2} \right), \left( \frac{100}{2} \right), \left( \frac{200 - 100}{2} \right) \right\}$$

$$\tau_{\max} = 100 \text{ N/mm}^2$$

130.(D)  $\delta \propto \frac{1}{I}$        $\{D > B\}$

$$\delta_1 \propto \frac{1}{BD^3}$$

$$\delta_2 \propto \frac{1}{DB^3}$$

$$\frac{\delta_2}{\delta_1} = \frac{BD^3}{DB^3}$$

$$\frac{\delta_2}{\delta_1} = \left( \frac{D}{B} \right)^2$$

So  $\delta_2 > \delta_1$

144.(C)  $C_s = \frac{\omega_2 - \omega_1}{\left( \frac{\omega_1 + \omega_2}{2} \right)}$

$$= \frac{410 - 390}{\left( \frac{410 + 390}{2} \right)}$$

$$= \frac{20 \times 2}{800}$$

$$C_s = 0.05$$

148(D)  $\eta_{\max} = \frac{1 - \sin \phi}{1 + \sin \phi}$

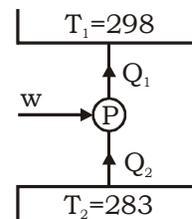
$$= \frac{1 - \sin 30^\circ}{1 + \sin 30^\circ}$$

$$= \frac{1/2}{3/2} = \frac{1}{3}$$

$$= 0.33$$

$$\eta_{\max} = 33\%$$

159.(D)



$$\frac{Q_2}{Q_1} = \frac{283}{298} \quad \dots (i)$$

$$\text{and } Q_1 - Q_2 = 1 \quad \dots (ii)$$

$$Q_1 - \frac{283}{298} Q_1 = 1$$

$$Q_1 \left[ \frac{15}{298} \right] = 1$$

$$Q_1 = \frac{298}{15} = 19.868 \text{ kW}$$

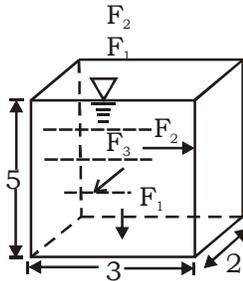
172.(B)  $v = 0.5 \times 10^{-4} \text{ m}^2/\text{s}$   
 $D = 0.05 \text{ m}$

$$\frac{V_c D}{\nu} = 2000$$

$$V_c = \frac{2000 \times 0.05 \times 10^{-4}}{0.05}$$

$$= 2 \text{ m/s}$$

178.(D)



force on surface  $2\text{m} \times 3\text{m}$

$$F_1 = 700 \times g \times 5 \times (2 \times 3)$$

$$= 206.01 \text{ kN}$$

Force on surface  $2\text{m} \times 5\text{m}$

$$F_2 = 700 \times g \times \left(\frac{5}{2}\right) \cdot (2 \times 5)$$

$$= 171.675 \text{ kN}$$

Force on surface  $3\text{m} \times 5\text{m}$

$$F_3 = 700 \times g \cdot (5/2) \cdot (5 \times 3)$$

$$= 257.512 \text{ kN}$$

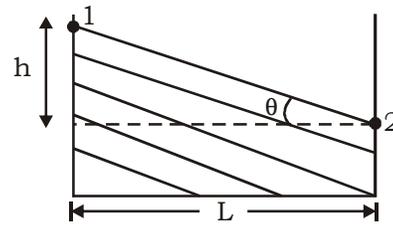
183(A)  $\frac{\partial P}{\partial x} = -\rho \cdot a_x = -2.45 \times 10^3$

$$\frac{\partial P}{\partial z} = -\rho \cdot g = -9.81 \times 10^3$$

$$d_p = \frac{\partial P}{\partial x} \cdot dx + \frac{\partial P}{\partial z} \cdot dz$$

$$d_p = (-2.45 dx - 9.81 dz) \times 10^3$$

$$P_2 - P_1 = 10^3 [-2.45 (x_2 - x_1) - 9.81 (z_2 - z_1)]$$



Take point 1 and 2 on free surface at extreme ends.

$$P_1 = P_2 = P_{\text{atm}}$$

$$\text{So } P_2 - P_1 = 0 = 10^3 [-2.45 L - 9.81 \times h]$$

$$2.45L = -9.81h$$

$$\text{or } \frac{h}{L} = \frac{2.45}{9.81}$$

$$\text{or } \tan \theta = 0.2497$$

$$\boxed{\theta = 14.02^\circ}$$

190.(C)  $(\text{COP})_{\text{Ref}} = 4$

$$(\text{COP})_{\text{HP}} = (\text{COP})_{\text{Ref}} + 1$$

$$\text{or } (\text{COP})_{\text{HP}} = 5$$

$$\text{or } (\text{COP})_{\text{HP}} = \frac{Q_1}{w}$$

$$5 = \frac{Q_1}{1}$$

$$Q_1 = 4 \text{ kW}$$

195.(A)  $D = 200\text{mm}$

$$d = 1 \text{ cm}$$

$$\text{Jet ratio (m)} = \frac{D}{d}$$

$$= \frac{200}{10}$$

$$m = 20$$

$$\text{and number of bucket (z)} = 15 + \frac{D}{2d}$$

$$= 15 + \frac{200}{2 \times 10}$$

$$Z = 25$$