GMR Classes

NEET - MOT -35 - DT 06-04-2020 - Keys And Solutions

Total Marks : 720
Duration : 3:00 hrs

KEY

1. (C)	**2.** (B)	**3.** (B)	**4.** (D)
5. (D)	**6.** (A)	**7.** (B)	**8.** (C)
9. (A)	**10.** (A)	**11.** (A)	**12.** (B)
13. (D)	**14.** (C)	**15.** (B)	**16.** (D)
17. (A)	**18.** (C)	**19.** (D)	**20.** (C)
21. (C)	**22.** (A)	**23.** (A)	**24.** (C)
25. (D)	**26.** (D)	**27.** (D)	**28.** (A)
29. (B)	**30.** (A)	**31.** (C)	**32.** (C)
33. (B)	**34.** (D)	**35.** (D)	**36.** (B)
37. (D)	**38.** (C)	**39.** (B)	**40.** (D)
41. (C)	**42.** (D)	**43.** (B)	**44.** (B)
45. (C)	**46.** (B)	**47.** (C)	**48.** (C)
49. (C)	**50.** (D)	**51.** (B)	**52.** (C)
53. (A)	**54.** (B)	**55.** (A)	**56.** (B)
57. (C)	**58.** (C)	**59.** (C)	**60.** (C)
61. (A)	**62.** (B)	**63.** (D)	**64.** (B)
65. (D)	**66.** (D)	**67.** (C)	**68.** (A)
69. (A)	**70.** (B)	**71.** (B)	**72.** (B)
73. (C)	**74.** (C)	**75.** (D)	**76.** (C)
77. (C)	**78.** (C)	**79.** (C)	**80.** (B)
81. (D)	**82.** (B)	**83.** (B)	**84.** (A)
85. (C)	**86.** (D)	**87.** (C)	**88.** (D)
89. (D)	**90.** (B)	**91.** (D)	**92.** (A)
93. (C)	**94.** (D)	**95.** (D)	**96.** (A)
97. (C)	**98.** (C)	**99.** (A)	**100.** (D)

101. (D) **102.** (A) **103.** (A) **104.** (C)

105. (A) **106.** (D) **107.** (B) **108.** (B)

109. (A) **110.** (D) **111.** (B) **112.** (A)

113. (A) **114.** (C) **115.** (C) **116.** (A)

117. (C) **118.** (D) **119.** (A) **120.** (B)

121. (C) **122.** (C) **123.** (B) **124.** (B)

125. (D) **126.** (C) **127.** (A) **128.** (D)

129. (C) **130.** (D) **131.** (B) **132.** (A)

133. (B) **134.** (B) **135.** (D) **136.** (B)

137. (C) **138.** (B) **139.** (A) **140.** (D)

141. (C) **142.** (D) **143.** (D) **144.** (C)

145. (A) **146.** (C) **147.** (B) **148.** (D)

149. (C) **150.** (A) **151.** (D) **152.** (C)

153. (A) **154.** (D) **155.** (C) **156.** (A)

157. (C) **158.** (C) **159.** (D) **160.** (C)

161. (A) **162.** (A) **163.** (A) **164.** (C)

165. (A) **166.** (D) **167.** (A) **168.** (A)

169. (D) **170.** (D) **171.** (A) **172.** (D)

173. (B) **174.** (D) **175.** (B) **176.** (A)

177. (B) **178.** (B) **179.** (A) **180.** (A)

SOLUTIONS

1. $K.E = \frac{1}{2} \times 2 \times \left(20 \times 10^{-2}\right)^2 (100)^2$

$= 400J$

4. $V = \ u - gt - V_r \, in \ \left\lfloor \frac{m_0}{m} \right\rfloor$

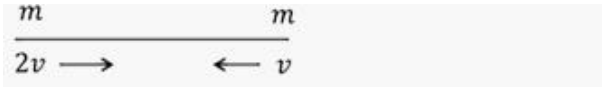
$$8 = 0 - 0.00981 \times 30 - 3 \times 2.303 \log_{10}\left[\frac{m_0}{m}\right]$$

$$1.200 = -\log_{10}\left[\frac{m_0}{m}\right]$$

$$1.2 = \log_{10}\left|\frac{m}{m_0}\right|$$

$$10^{1.2} = \frac{m}{m_0}$$

$$\frac{14:37}{1} = \frac{m}{m_0}$$



5. Net force = 0.Hence Centre Of Mass is always at rest.

6. Conceptual

7. $S > VT$

$$S > (\omega R)\left(\frac{2\pi}{\omega}\right)$$

$$S > 2\pi R$$

8. Angular velocity & angular acceleration of every particle of disc is same

$$a_p = r_p\sqrt{a^2 + \omega^2}$$

$$a_Q = r_Q\sqrt{a^2 + \omega^4}$$

$$\therefore r_p \succ r_Q \Rightarrow a_p \succ a_Q$$

9. $\frac{2}{5}m\left[4r^2+5a^2\right]$

10.

Fraction of kinetic energy retained $= \left(\frac{m_2-m_1}{m_1+m_2}\right)^2$

11. It is clear that the 10 kg kid should sit at the end and the 15 kg kid should sit closer to the centre. Suppose his distance from the centre is x. As the kids are in equilibrium, the normal force between a kid and the seesaw equals the weight of that kid. Considering the rotational equilibrium of the seesaw, the torques of the forces acting on it should add to zero.
Taking torques about the fulrcum
(15kg)g x = (10 kg)g (2.5m)
or x = 1.7 m.

12. $I_\omega = constant$

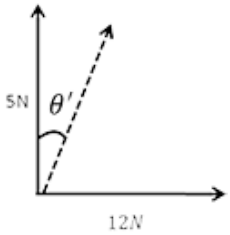
$$I_1\omega_1 + I_2\omega_2 = constant$$

$$I_1\omega_1 + mgr_2^2\omega_2 = constant$$

$$As\ girl\ moves\ angular\ velocity\ of\ girl\ increases$$

13. Conceptual

14.



$\tan\theta = \frac{12}{5}$

$\bar{a} = \frac{m_1a_1+m_2a_2}{m_1+m_2}$

$= \frac{9\times\left(\frac{12}{9}\right)\hat{i}+\left(4\times\frac{5}{9}\right)\hat{j}}{9+4}$

$= \frac{1}{13}(12\hat{i}+5\hat{j})$

$= \frac{|13|}{13} = 1\ m/s^2$

16. $mg\frac{L}{2} = \frac{mL^2}{3}\alpha \rightarrow \alpha = \frac{3g}{2L}$

17. $L_1 = L_2$

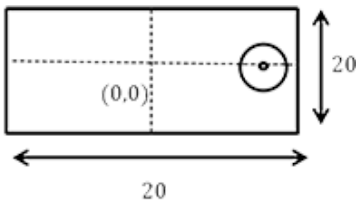
$$I_1\omega_1 = \frac{I_1}{n}\omega_2$$

$$\omega_2 = n\omega_1$$

18. Conceptual

19. Internal forces do not cause any shift in mass.

20.



$initial\ \ cm = (0,0)$

$final = \frac{0 - \pi(4)^2 \times 6}{(20)^2 - \pi(4)^2}$

$= \frac{-\pi\, 6}{25-\pi}$

Distance from initial position

$= 0 - \left(\frac{6\pi}{25-\pi}\right)$

$= \frac{6\pi}{25-\pi}$

21. $At\ B$

$$mg = \frac{mV^2}{r}$$

$$V = \sqrt{gr}$$

$From\ top\ to\ A$

$$mgR = \frac{1}{2}mV_0^2$$

$At\,A:$

$$Energy = \frac{1}{2}mv_0^2$$

$At\,B:$

$$Energy = \frac{1}{2}mv^2 + mg(2r) = \frac{5}{2}mgr$$

$$But\ \frac{1}{2}mv_0^2 = \frac{5}{2}mgr$$

$$mgR = \frac{5}{2}mgr$$

$$\therefore \frac{R}{r} = \frac{5}{2}$$

22. $after\ 25\ seconds\ mass\ of\ rocket = 240 - 6 \times 25$

$$= 90\ \ kg$$

$$V = \ 2 \times 2.303 \times \log_{10}\left|\frac{240}{90}\right|$$

$$= 1.96\ \ km/s$$

23.

Let E be the electric field at a distance r from the centre of the disc. From the newton's second law, we have

$F_{\mathrm{n}} = ma_{\mathrm{n}}$

$\Rightarrow eE = m\omega^2 r$

$\Rightarrow E = \frac{m\omega^2 r}{e}$

Now, potential difference between the rim and the centre of disc is

$V_R - V_C = \Delta V = \int_0^{\mathrm{a}} E.dr$

$\Rightarrow \Delta V = \int_0^{\mathrm{a}} \frac{m\omega^2 r}{e} dr$

$\Rightarrow \Delta V = \frac{m\omega^2 a^2}{2e}$

24. $\tau = I\alpha$

$$(mg)\frac{L}{2} = \frac{mL^2}{3}\alpha$$

$$\alpha = \frac{3g}{2L}$$

25. $v = at$

$$\frac{15}{20} = a$$

$$\Rightarrow a = R\alpha$$

$$3 \times \frac{15}{20} = \alpha = 2.25\, rad/s^2$$

$$\theta = \frac{1}{2}\left(\frac{3 \times 15}{20}\right) \times 20 \times 20$$

$$= 450\, rad$$

26. $Cylinder\ will\ slide\ if\ mg\sin\theta > \mu mg\cos\theta$

$$= \tan\theta > \mu$$

$$The\ cylinder\ will\ topple\ of\ (mg\sin\theta)\frac{h}{2} > (mg\cos\theta)\ r$$

$$= \tan\theta > \frac{2r}{h}$$

$$for\ toppling\ \mu > \frac{2r}{h}$$

$$for\ slidding\ \mu < \frac{2r}{h}$$

28. $$x_{cm} = \frac{1\times 1^2 + 2\times 2^2 + 3\times 3^2 + \ldots + nn^2}{1+2+3\ldots n}$$

$$= \frac{\frac{n^2(n+1)^2}{4}}{\frac{n(n+1)}{2}}$$

$$= \frac{n(n+1)}{2}$$

30.

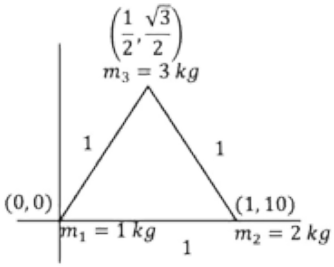
As centre of mass is more distance from A

$I_A > I_B$

As '0' has large mass particles far than 'C'

$I_O > I_C$

31.



$x_{COM} = \frac{m_1x_1+m_2x_2+m_3x_3}{m_1+m_2+m_3}$

$\Rightarrow \frac{\frac{3}{2}+2}{6}$

$\Rightarrow \frac{7}{12}$

$y_{COM} = \frac{m_1y_1+m_2y_2+m_3y_3}{m_1+m_2+m_3}$

$\Rightarrow \frac{0+\frac{3\sqrt{3}}{2}+0}{6}$

$\Rightarrow \frac{\sqrt{3}}{4}$

$COM = \left(\frac{7}{12},\frac{\sqrt{3}}{4}\right)$

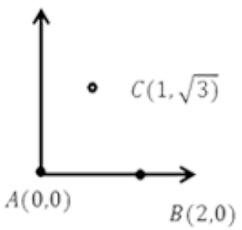
34. $I_0 = \frac{ml^2}{6}$

$$I_{d_1} + I_{d_2} = \frac{ml^2}{6}$$

$$Id_1 = Id_2 = \frac{ml^2}{12}$$

35.

coordinates of $c = (1, \sqrt{3})$



$x_{cm} = \frac{m_1x_1+m_2x_2+m_3x_3}{m_1+m_2+m_3}$

$= \frac{0+2\times2+2\times1}{1+2+2} = \frac{6}{5}$

$y_{cm} = \frac{m_1+y_1+m_2y_2+m_3y_3}{1+2+2}$

$= \frac{0+0+2\sqrt{3}}{1+2+2} = \frac{2\sqrt{3}}{5}$

37.

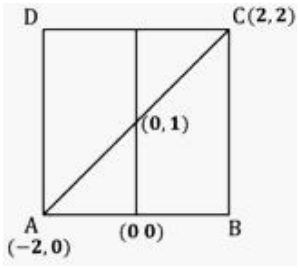
$m_1 = \sigma\pi(2R)^2$
$x_1 = 0$
$m_2 = \sigma\pi R^2$
$x_2 = R$
$x_{cm} = \dfrac{m_1x_1 + m_2x_2}{m_1 + m_2}$

39.

$1 = \frac{10(7)+30y}{40}$
$40 = 70 + 30y$

40. Conceptual

42.



43. Conceptual

44. $I_z = 2I_x$

$$\frac{4}{2} = I_x = I_d = 2$$

45. Conceptual

46. Conceptual

47.

$AgNO_3 = 0$
$+1 + x + (-2 \times 3) = 0$
$x = 6 - 1 = +5$

48.

$Al_4C_3 + 12D_2O \rightarrow 3CD_4 + 4Al(OD)_3$

$\frac{1\times200}{50} = 24$

50. $x = 4$

51. Conceptual

52. Conceptual

53. Conceptual

54. Conceptual

55. There is no unpaired electrons.

56. A) $Cr(OH)_3$ is yellow
B) H_2TiO_4 (per titanic acid) has orange red colour
C) $KMnO_4$ is pink coloured, which is decolourised to Mn^{+2}
D) Starch iodide paper turns into blue.

57. Conceptual

$\%\frac{w}{v} = \frac{Volume\ strength}{3.3}$

$= \frac{10}{3.3}$

58. $= 3$

59. Shows +8 oxidation state

NH_4NO_3

$x + 4 - 1 = 0$

60. $x = -3$

61.

Oxidation number of I in KI_3.

$1 + 3(x) = 0 \Rightarrow x = -\frac{1}{3}$

Oxidation number of Fe in Fe_3O_4.

$3x + 4(-2) = 0 \Rightarrow x = +\frac{8}{3}$

63.

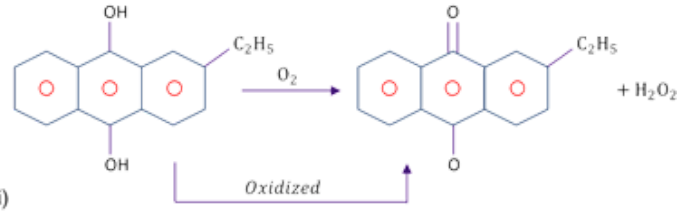
(i) $H_2SO_4 + BaO_2 \xrightarrow{peroxide} H_2O_2$.

Being dioxide , the substance cannot form H_2O_2

(ii) $H_2O_2 \longrightarrow O_2$ ($-1 \rightarrow 0$, Oxidation)

H_2O_2 acts as reducing agent it can form peroxide.

(iii)



2- ethyl anthroquinol is getting oxidized.

(iv) $k_2Cr_2O_7 + H_2SO_4 + 4H_2O_2 \xrightarrow{ether} 2CrO_5 + K_2SO_4 + 5H_2O$

(blue color)

$5H_2O_2 + XClO_2 + 2OH^- \longrightarrow XCl^- + 4O_2 + 6H_2O$

a)If $x = 5$ *and* $y = 2$ then

$5H_2O + 5ClO_2 + 2OH^- \longrightarrow 5Cl^- + 2O_2 + 6H_2O$

Number of oxygens are unbalanced

b) If $x = 2$ *and* $y = 5$ then

$5H_2O_2 + 2ClO_2 + 2OH^- \longrightarrow 2Cl^- + 5O_2 + 6H_2O$

64. Balanced equation

65. Conceptual

66.

D_2O molecular weight: 20

% of deuterium= $\frac{4}{20} \times 100 = 20\%$

67. Conceptual

68.

Balanced equation is, $3CuO + 2NH_3 \rightarrow 3Cu_2 + N_2 + 3H_2O$

$3\ moles\ of\ K_2Cr_2O_7 \longrightarrow 1\ mole\ of\ Cr_2O_3$

$1\ mole \longrightarrow ?$

69. $\frac{|x|}{3} = \frac{1}{3}$

70. Conceptual

71.

$2H_2O_2 \rightarrow 2H_2O + O_2$
$68\ g \rightarrow 22.4\ l\ (STP)$
$1\ lit \rightarrow 10\ lit$
$x\ gms \rightarrow 10\ lit$
$\therefore x = \frac{68\times10}{22.4} = 30.36\ g/lit$

72. $CrO(O_2)_2$ x – 2 + 2(– 2)= 0
x = +6
4 oxygen are peroxide

73. Conceptual

75. (Volume strength) = 5.6 x Normality = 5.6 × 10 = 56

76. Conceptual

80. Conceptual

81.
$EC = 13$
$EC = 1s^2|2s^2 2p^6|3s^2 3p^1$
$\therefore EC = 2|8|3$

82. Conceptual

83. $Molarity = \frac{Volume\ strength}{11.2} = \frac{20}{11.2} = 1.785 = 1.8M$

84. Conceptual

85. $Ca(OH)_2$ is used to remove temporary hardness of water.

87. Conceptual

88.
$2(-2) + 2x = 0 \Rightarrow 2x = 4 \Rightarrow +2$

D_2 has same electronic Configuration as the hydrogen atom.

90. ${}_1^2D = 1.s^1$ ${}_1H^1 = 1.s^1$

91. Motor or bull form cell & in grasses shows turgor moment.

92. The compounds that inhibit the action of auxin are known as anti-auxins.
Ex: (1) P– Chlorophenoxy isobutyric acid (PCIB) is substance that competes with auxins for binding sites.

93. Conceptual

94. The environmental factors affecting transpiration in plants include light, relative humidity, temperature, availability of water, and wind.
Higher temperatures cause the plant cells which control the openings (stoma) where water is released to the atmosphere to open, whereas colder temperatures cause the openings to close.
As the relative humidity of the air surrounding the plant rises the transpiration rate falls. It is easier for water to evaporate into dryer air than into more saturated air. Wind and air movement: Increased movement of the air around a plant will result in a higher transpiration rate.

95. Conceptual

96. Conceptual

97. Intermodal elongation is stimulated by gibberellin. In rosette plant when gibberellin is applied, the stem first elongates, produces vegetative shoot (Bolting) and later flowering was occurred.

98. Conceptual

99. Apical dominance in higher plants is due to phytohormones (i.e., Auxins).

100. Conceptual

101. Conceptual

102. Variations in the electrical components of the sodium potential, which have not been measured, may explain apparently contradicting results on active sugar and amino acid transport with various tissue preparations. Na^+ ions moves into the cell and against the concentration from extracellular to cytoplasm of the cell.

103. Avena coleoptile test to find out the quantity of growth promoting hormones was discovered by F.W. Went.

105. Conceptual

107. Conceptual

108. Conceptual

109. Conceptual

110. Conceptual

111. Conceptual

112. Conceptual

113. Xerophytes are a group of plants that live in very dry regions. Plants can have waxy stomata, few stomata or stomata that open only at night. Succulent leaves, stems, or tubers help in water storage, which helps when the surrounding environment isn't providing water.

115. A membrane that is selectively permeable, i.e. being permeable to only certain molecules and not to all molecules. Supplement. An example of such membrane is the cell membrane wherein it allows passage of only certain types of molecules by diffusion and occasionally by facilitated diffusion.

116. Conceptual

117. Conceptual

118. Conceptual

119. Conceptual

120. Conceptual

121. The most common cytokinin is isopentenyl adenine.

122. Gustafson in 1936 proved that substituting pollination and fertilization with auxins can stimulate the formation of seedless fruits.

123. Gibberellins stimulate the synthesis of various types of hydrolytic enzymes for mobilisation of reserve food, e.g. amylases, proteases.

124. Conceptual

125. Conceptual

126. Conceptual

127. Conceptual

129. The girding experiment refers to the removal of the outer layer of a stem. By doing so, you are cutting off the phloem of a stem, not allowing it's supply to flow to the roots, resulting in their death. The 'food' supplied by the phloem is blocked above the area of removal. For this experiment to be successful, the arrangement of the vascular bundles (xylem and phloem) must in the firm of a ring. This is present in dicots, while monocot plants have scattered vascular bundles i.e that lack organisation. Monocot have random arrangements of xylem and phloem while dicots have a star shaped arrangement.

130. Plants bend toward the light because cells on the shaded side elongate more.

131. Conceptual

132. Conceptual

133. Conceptual

134. Conceptual

135. Conceptual

137. Smooth muscle is found mainly in the walls of hollow organs, such as digestive tract organs and blood vessels. Smooth muscles propel substances through the hollow organ by alternately contracting and relaxing.

140. Blood enters the kidney via renal artery. Urea is removed from blood by the kidneys. Hence, when blood leaves kidney via renal vein, amount of urea is less in blood compared to level of urea in blood contained in any other blood vessel.

142. Conceptual

143. It is possible to live with one kidney, although certain lifestyle changes must be made. It is even possible to survive without any kidneys, but dialysis and intensive treatment would be required for the rest of your life.

148. Conceptual

151. Urine color generally ranges from a pale-yellow color to deep amber. This coloring is primarily caused by the pigment urochrome, also known as urobilin. Whether your urine is diluted by water or in a more concentrated form determines the appearance of the pigment.

152. Fine motor control is accomplished by the presence of smaller, more numerous motor units. Each motor unit requires an individual motor neuron.

155. Movement of Ca^{2+} out in sarcoplasmic reticulum controls the making and breaking of actin and myosin complex actomyosin due to which muscle contraction and relaxation takes place. Albert Szent Gyorgyi worked out biochemical events of muscle contraction.

157. Urinary excretion of Na is regulated by Anrenal cortex.

165. Freshwater fish have very efficient kidneys that excrete water quickly. They also reabsorb salt from their urine before it is ejected to minimize losses and actively take salt from their environment using special cells in the gills.

168. Birds and lizards

172. The last two pairs *i.e.* 11^{th} and 12^{th} pairs ribs remain free anteriorly, hence, they are called as floating ribs.

176. Hyaline cartilage is most abundant cartilage in body.

177. Conceptual