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Subject Name & Code : Dynamics of Machinery (PCME404) Exam Name : Q1

1. Which of the following is incorrect regarding inertia force? [D]

A) Imaginary force B) Acts upon a rigid body C) Brings the body to equilibrium D) Same direction as of accelerating force

2. Inertia torque acts in the _____ direction as the accelerating couple? [B]

A) Same B) Opposite C) Perpendicular D) inclined

3. If a force has a line of action at a distance h from the centre of gravity, then the value of h is given by _____ [A]

A) I. a/F B) I. a/m.g C) I/m.k D) m.k/I

4. D-Alembert's principle is used for which of the following? [B]

A) Change static problem into a dynamic problem B) Change dynamic problem to static problem C) To calculate moment of inertia of rigid bodies D) To calculate angular momentum of a system of masses

5. In the expression F – m.a = 0, the term (m.a)is called _____ [A]

A) Reversed effective force B) Net force C) Coriolis force D) Resultant force

6. Why the inertia torque acts in the opposite direction to the accelerating couple? [A]

A) Bring the body in equilibrium B) To reduce the accelerating torque C) Acts as a constraint torque D) Increase the linear acceleration

7. A body remains in equilibrium if _____ [B]

A) Inertia force is applied in the same direction to the resultant force B) Inertia force is applied in the direction opposite to the resultant force C) Inertia force is applied in the direction Perpendicular to the resultant force D) Inertia force is applied in the direction Parallel to the resultant force

8. Inertia force is _____ the reversed effective force [A]

A) Equal B) multiple C) inverse D) half

9. G is the center of gravity, the quantity h is known as the “offset”. I is the moment of inertia and k is the radius of gyration. Offset’s value is given by? [A]

A) I. a/F B) I. a/m.g C) I/m.k D) m.k/I

10. Considering a four bar chain with each link having linear and angular acceleration, applying D-Alembert’s principle will never result in which of the following member? [A]

A) 2- force member B) 3- force member C) 4 – force member D) Non accelerating member

11. Force which does not act on the connecting rod is _____ [D]

A) Weight of connecting rod B) Inertia force of connecting rod C) Radial force D) Coriolis force

12. Inertia forces on the reciprocating parts acts _____the line of stroke. [B]

A) opposite B) along C) Inclined D) perpendicular

13. When mass of the reciprocating parts is neglected then the inertia force is _____ [C]

A) Maximum B) Minimum C) 0 D) Not defined

14. Torque due to _____ of the connecting rod affects the torque due to connecting rod. [C]

A) Rigidity B) Tension C) weight D) None of the mentioned

15. Correction couple is applied when masses are placed arbitrarily and to maintain _____ [B]

A) Static equilibrium B) Dynamic equilibrium C) Stable equilibrium D) Unstable equilibrium

16. Torques required to accelerate a 2 mass system and to accelerate a rigid body is called correction couple. [A]

A) correction couple B) couple C) Torque D) inertia

17. The height of a Watt’s governor (in metres) in equal to [C]

A) 8.95/N2 B) 89.5/N2 C) 895/N2 D) 8950/N2

18. Mass moment of inertia of two arbitrary masses placed will be _____as the mass moment inertia of the rigid body. [D]

A) same B) Opposite C) zero D) Different

19. The crank effort is the product of crankpin radius and _____. [B]

A) thrust on sides B) crankpin effort C) force acting along the connecting rod D) piston effort

20. In a horizontal engine, the weight of the reciprocating parts _____to the piston effort. [C]

A) also add B) Also subtract C) Not Considered D) None of the mentioned

21. Mass is _____ quantity [C]

A) Velocity B) acceleration C) scalar D) vector

22. The length of the crank and connecting rod are 150 mm and 600 mm. The crank position is 60 degrees from the inner dead center. The crankshaft speed is 400 r.p.m. Find the acceleration in m/s2 of the slider. [A]

A) 98.6 B) 108.6 C) 88.6 D) 78.6

23. While calculating the angular acceleration of the connecting rod, sin2(?) term is neglected. [A]

A) neglected B) Considered C) twice D) None of the mentioned

24. Crank effort is the net force applied at the crankpin _____to the crank which gives the required turning moment on the crankshaft. [B]

A) parallel B) perpendicular C) at 60 D) at 4

25. In a dynamically equivalent system, a uniformly distributed mass is divided into ____point masses. [A]

A) 2 B) 3 C) 4 D) 5

26. Any distributed mass can be replaced by two point masses to have the same dynamical properties if [D]

A) the sum of the two masses are equal to the total mass B) the combined center of mass coincides with that of the rod C) the moment of inertia of two point masses about perpendicular axis through their combined center of mass is equal to that of the rod D) all of the mentioned

27. force is _____ quantity [A]

A) vector B) mass C) time D) scalar

28. Which of the following is not the required condition for replacing a rigid body by a dynamically equivalent system of two masses? [B]

A) The sum of the two masses are equal to the total mass.
B) The sum of the squares of two masses are equal to the square of the total mass.
C) The combined center of mass coincides with that of the rod.
D) The moment of inertia of two point masses about perpendicular axis through their combined center of mass is equal to that of the rod.

29. The essential condition of placing the two masses, so that the system becomes dynamically equivalent is _____. where l1 and l2 = Distance of two masses from the center of gravity of the body, and kG = Radius of gyration of the body. [A]

A) l1.l2 = kG^2
B) l1+l2 = kG^2
C) l1 - l2 = kG^2
D) l1/l2 = kG^2

30. The effort of a governor is the _____ force exerted at the sleeve for a given percentage change of speed. [C]

A) Maximum
B) Minimum
C) Mean
D) Reciprocal of

31. How should the equilibrium speed vary with the increase of radius of rotation of the governor balls for stability? [A]

A) Must increase
B) Must decrease
C) Must remain constant
D) Equilibrium speed independent of radius of rotation

32. retardation of a piston In a horizontal engine then reciprocating parts are moves from _____. [C]

A) midway to TDC
B) BDC to midway
C) BDC toTDC
D) TDC to BDC

33. When the piston is accelerated, the piston effort is given by which of the following the equation? [B]

A) F(L) = F(I)
B) F(L) + F(I)
C) F(L) * F(I)
D) F(L) / F(I)

34. In the presence of frictional resistance, the expression for piston effort is _____ [B]

A) F(L) / F(I) + R(f)
B) F(L) ± F(I) – R(f)
C) F(L) – F(I) - R(f)
D) F(L) + F(I) + R(f)

35. area is _____ quantity [C]

A) mechanical
B) physical
C) scalar
D) vector

36. If the crank and the connecting rod are 300 mm and 1 m long respectively and the crank rotates at a constant speed of 250 r.p.m., determine the crank angle at which the maximum velocity occurs is ____ [B]

A) 45
B) 75
C) 60
D) 90

37. If the crank and the connecting rod are 600 mm and 2 m long respectively and the crank rotates at a constant speed of 250 r.p.m, determine maximum velocity of the piston in m/s is _____ [B]

A) 15 B) 17.5 C) 20 D) 10.5

38. The crank and connecting rod of a steam engine are 0.3 m and 1.5 m in length. The crank rotates at 150 r.p.m. clockwise, determine velocity of the piston when the crank is at an angle 40 degrees from IDC. [C]

A) 4.19 B) 5 C) 3.49 D) 3.36

39. When the acceleration of the piston is 0, then the velocity is _____ [A]

A) Maximum B) Minimum C) Negative D) Half the maximum

40. The length of the crank and connecting rod are 150 mm and 600 mm. The crank position is 60° from the inner dead center. The crankshaft speed is 400 r.p.m. Find the acceleration in m/s2 of the slider [C]

A) 101.5 B) 100.6 C) 98.6 D) 97.6

41. Which of the following relation is correct regarding the net gyroscope couple C acting on a four wheel vehicle? [C]

A) ωw.ωp (4 Iw ± G.Ie)2 B) ωw.ωp (4 Iw* G.Ie) C) ωw.ωp (4 Iw ± G.Ie) D) ωw2(4 Iw ± G.Ie)

42. The correction couple does not depend on _____ [D]

A) Distance between arbitrary masses B) Distance between the two masses for a true dynamically equivalent system C) Radius of gyration of equivalent system D) Distance between fixed masses

43. A Piston will remain in equilibrium if _____ [B]

A) Inertia force is applied in the same direction to the resultant force B) Inertia force is applied in the direction opposite to the resultant force C) Inertia force is applied in the direction Perpendicular to the resultant force D) Inertia force is applied in the direction Parallel to the resultant force

44. For a slider crank mechanism, the total no. of dead centres are _____ [C]

A) 0 B) 1 C) 2 D) 3

45. acceleration is _____ quantity [A]

A) vector B) mass C) time D) scalar

46. desplacement is _____ quantity [A]

A) vector B) mass C) time D) scalar

47. What will be the shape of the velocity diagram of the slider crank mechanism if there are three links including the slider. [A]

A) Triangle B) Parallelogram C) Square D) Trapezium

48. If the normal component of the acceleration is doubled, what will be the effect on the radial component? [A]

A) Doubled B) Halved C) Remains same D) Becomes 4 times

49. If the body is not rotating with a _____angular velocity then there are both radial and tangential component of acceleration. [A]

A) constant B) zero C) Variable D) None of the mentioned

50. Which component of acceleration is parallel to the given link? [A]

A) Radial B) Tangential C) Coriolis D) Pseudo

51. acceleration is parallel to the velocity of given link is_____ component [D]

A) Coriolis B) Pseudo C) Radial D) Tangential

52. The component of the acceleration directed towards the center of rotation of a revolving body is known as _____ component. [B]

A) tangential B) centripetal C) coriolis D) None of the mentioned

53. The power of a Porter governor is equal to [D]

A) c2/1 + 2c (m + M)gh B) 2c2/1 + 2c (m + M)gh C) 3c2/1 + 2c (m + M)gh D) 4c2/1 + 2c (m + M)gh

54. At an instant, if the angular velocity of a link is clockwise then the angular acceleration will be [C]

A) clockwise B) counterclockwise C) in any direction D) None of the mentioned

55. Angular acceleration of a link AB is given by [B]

A) centripetal acceleration/length B) tangential acceleration/length C) total acceleration/length D) None of the mentioned

56. In a slider crank mechanism. the maximum acceleration of slider is obtained when the crank is [B]

A) at the inner dead centre position B) at the outer dead centre position C) exactly midway position between the two dead centres D) slightly in advance of the midway position between the two dead centres

57. The lengths of the links of a 4- bar linkage with revolute pairs only are p,q,r and s units. Given that p < q < r < s and s+p < q+r which of these links should be the fixed one, for obtaining a 'double crank' mechanism? [A]

A) link of length p B) ink of length q C) ink of length r D) link of length s

58. In a slider-crank mechanism, the crank is rotating with an angular velocity of 20 rad/s in counterclockwise direction. At the instant when the crank is perpendicular to the direction of the piston movement, velocity of the piston is 2 m/s. Radius of the c [A]

A) 10 B) 100 C) 0.1 D) 0.01

59. For the same crank length and uniform angular velocity of the crank in an offset slider crank mechanism, if the connecting rod length is increased by 1.5 times, the velocity of piston will [C]

A) remain unchanged B) increase 1.5 times C) decrease by 1.5 times D) increase by 1.5v2 times

60. Secondary force in reciprocating engine mechanism is caused due to _____ [C]

A) S.H.M. of reciprocating parts B) oscillation of reciprocating parts C) obliquity of arrangement of reciprocating parts D) all of the mentioned

61. In S.H.M acceleration is Proportional to _____ [B]

A) Velocity B) Displacement C) Acceleration D) None of the mentioned

62. Angular acceleration of a link can be determined by dividing the [A]

A) Tangential component of acceleration with length of link B) Centripetal component of acceleration with length of link C) Resultant of acceleration with length of link D) all of the mentioned

63. The approximate straight line mechanism is [A]

A) Four bar linkage B) six bar linkage C) eight bar linkage D) five bar linkage

64. Horizontal engine Total inertia torque of connecting rod [A]

A) T=Tnet + Tb + Tc B) T=Tnet - Tb + Tc C) T=Tnet + Tb - Tc D) T=Tnet - Tb - Tc

65. Vertical engine Total inertia torque of connecting rod [A]

A) T=Tnet + Tb + Tc + mg B) T=Tnet - Tb + Tc - mg C) T=Tnet + Tb - Tc + mg D) T=Tnet - Tb - Tc- mg

66. Torque Exerted due to weight of mass m for horizontal engine [B]

A) Tb= (mg) r sin? B) Tb= (mg) r Cos? C) Tb= (mg)/ r Cos? D) Tb= (mg)/ r sin?

67. In a vertical engine Torque Exerted due to weight of mass m [A]

A) Tb= (mg) r sin? B) Tb= (mg) r Cos? C) Tb= (mg)/ r Cos? D) Tb= (mg)/ r sin?

68. Correction couple is [A]

A) Tc = (kmax^2 - kmin^2) a B) Tc = (kmax - kmin) a C) Tc = (kmin^2 - kmax^2) a D) Tc = (kmax^2 + kmin^2) a

69. In a connecting rod distance from big eye centre to small centre is called [A]

A) Length of connecting B) Radius of connecting C) Perpendicular distance of connecting D) None of the mentioned

70. In a connecting rod had mass m then mass placed at center of a small end is mb= [A]

A) m (b/(a+b)) B) m (a/(a+b)) C) m (b/(a-b)) D) m (a/(a-b))

71. In a connecting rod had mass m then mass placed at center of a small end is ma= [C]

A) m (b/(a+b)) B) m ((a+b))/a) C) m (a/(a+b)) D) m ((a+b)/b)

72. Net gas force acting on the piston is Fnet= [D]

A) (P1A2-P2A1) B) (P1A2+P2A1) C) (P2A2-P1A1) D) (P1A1-P2A2)

73. Power of a governor depends on which of the following factor? [A]

A) Mean effort B) Maximum effort C) Minimum effort D) Weight of the engine

74. Resistance in a sleeve which results in opposing the motion is caused by _____ [A]

A) Change of speed B) Change of weight C) Isochronism D) Change in type of governor

75. time is _____ quantity [D]

A) Velocity B) acceleration C) vector D) scalar

76. speed _____ quantity [D]

A) Velocity B) acceleration C) vector D) scalar

77. When the relation between the controlling force (FC) and radius of rotation (r) for a spring controlled governor is FC = a.r + b, then the governor will be [B]

A) stable B) unstable C) isochronous D) varible

78. Isochronism in a governor is desirable when [D]

A) the engine operates at low speeds B) the engine operates at high speeds C) the engine operates at variable speeds D) one speed is desired under one load

79. A hunting of governor is [C]

A) more stable B) less sensitive C) more sensitive D) isochronous

80. A governor is said to be hunting, if the speed of the engine [D]

A) remains constant at the mean speed B) is above the mean speed C) is below the mean speed D) fluctuates continuously above and below the mean speed

81. In a Hartnell governor, if a spring of greater stiffness is used, then the governor will be [C]

A) more sensitive B) less sensitive C) isochronous D) more stable

82. velocity _____ quantity [C]

A) Physical quantity B) mechanical quantity C) vector D) scalar

83. For two governors A and B, the lift of sleeve of governor A is more than that of governor B, for a given fractional change in speed. It indicates that [A]

A) governor A is more sensitive than governor B B) governor B is more sensitive than governor A C) both governors A and B are equally sensitive D) None of the mentioned

84. Which of the following is a spring controlled governor? [D]

A) Hartnell B) Hartung C) Pickering D) all of the mentioned

85. Which of the following governor is used to drive a gramophone? [C]

A) Watt governor B) Porter governor C) Pickering governor D) Hartnell governor

86. A Hartnell governor is a [B]

A) pendulum type governor B) spring loaded governor C) dead weight governor D) inertia governor

87. In a Porter governor sleeve moves upwards, the governor speed [C]

A) first increases and then decreases B) remains unaffected C) increases D) decreases

88. the ratio of the height of a Porter governor (when the length of arms and links are equal) to the height of a Watt's governor is [C]

A) (m/m)+M B) (M/m)+M C) (M/m)+m D) (m + M)

89. The height of a Watt's governor is [D]

A) directly proportional to speed B) directly proportional to angular velocity C) inversely proportional to angular velocity D) inversely proportional to speed

90. A Watt's governor can work satisfactorily at speeds from [A]

A) 60 to 80 r.p.m B) 80 to 100 r.p.m C) 100 to 200 r.p.m D) 200 to 300 r.p.m

91. When the sleeve of a Porter governor moves downwards, the governor speed [B]

A) increases B) decreases C) remains unaffected D) first increases and then decreases

92. A Porter governor is a [B]

A) dead weight governor B) pendulum type governor C) spring loaded governor D) inertia governor

93. In a Hartnell governor, the stiffness of the spring is given by [B]

A) S1 + S2/h B) S2 - S1/h C) S2 + S1/h D) S1 – S2/2h

94. Power of a governor is the [D]

A) mean force exerted at the sleeve for a given percentage change of speed B) workdone at the sleeve for maximum equilibrium speed C) mean force exerted at the sleeve for maximum equilibrium speed D) None of the mentioned

95. The effort of a Porter governor is equal to [B]

A) c(m – M)g B) c(m + M)g C) C/(m + M)g D) c/(m – M)g

96. For the isochronous Porter governor, the controlling force curve is a _____ line passing through the origin. [A]

A) straight B) Curve C) Zigzag D) Dashed

97. The controlling force diagram for a spring controlled governor is a _____ passing through the origin. [D]

A) Zigzag B) Dashed C) straight D) Curve

98. A spring controlled governor is said to be unstable when the controlling force [C]

A) increases as the radius of rotation decreases B) increases as the radius of rotation increases C) decreases as the radius of rotation decreases D) remains constant for all radii of rotation

99. In a spring controlled governor, when the controlling force _____ as the radius of rotation increases, it is said to be a stable governor. [C]

A) remains constant B) decreases C) increases D) zero

100. A spring controlled governor is said to be isochronous when the controlling force [D]

A) increases as the radius of rotation decreases B) increases as the radius of rotation increases C) decreases as the radius of rotation decreases D) remains constant for all radii of rotation

101. A spring controlled governor is found unstable. It can be made stable by [B]

A) increasing the spring stiffness B) decreasing the spring stiffness C) increasing the ball mass D) decreasing the ball mass

102. A spring controlled governor is said to be stable if the controlling force line when produced intersects the Y-axis [B]

A) at the origin B) below the origin C) above the origin D) on the origin

103. The power of a governor is the work done at [C]

A) the governor balls for change of speed B) the sleeve for zero change of speed C) the sleeve for a given rate of change of change D) each governor ball for given percentage change of speed

104. A governor is said to be isochronous when the equilibrium speed is [B]

A) variable for different radii of rotation of governor balls B) constant for all radii of rotation of the balls within the working range C) constant for particular radii of rotation of governor balls D) constant for only one radius of rotation of governor balls

105. For a given fraction of change in speed, a more sensitive governor will have a _____ [A]

A) Higher lift B) Lower lift C) More effective length D) Less effective length

106. For a given lift of the sleeve, the sensitiveness of the governor _____ as the speed range _____ [A]

A) Increases, decreases B) Decreases, Increases C) Increases, Increases, D) decreases, decreases

107. The equilibrium speed of a governor varies from 30 rpm to 20 rpm, find the sensitiveness of the governor. [A]

A) 0.4 B) 1.5 C) 0.66 D) 1.25

108. When a governor is fitted into an engine, then sensitiveness is defined as the ratio of _____ of maximum and minimum speed to the mean speed. [B]

A) Sum B) Difference C) Product D) Root mean square

109. For a governor, the sensitivity is 0.5 and the mean speed is 20 rpm, find the maximum speed. [B]

A) 15 rpm B) 25 rpm C) 30 rpm D) 40 rpm

110. For a stable governor, if the equilibrium speed _____ , the radius of governor balls must also _____. [C]

A) Increases, decreases B) Decreases, Increases C) Increases, Increases, D) decreases, decreases

111. On which of the following factors, the stability of governor does not depend? [D]

A) Speed B) Radius of rotation C) Governor equilibrium D) Mass of the engine

112. When the governor is too sensitive, then which of the following process occurs? [A]

A) Hunting B) More stability C) Less variation in speed D) Increased steadiness

113. When equilibrium speed is constant, then the governor is called _____ [D]

A) Pickering B) Hartung C) Porter D) Isochronous

114. The sensitiveness of an isochronous governor is _____ [A]

A) 0 B) 2 C) 0.5 D) 1

115. Which of the following type of governor cannot be isochronous? [B]

A) Pickering B) Porter C) Hartung D) Hartnell

116. An isochronous governor is not practical because of the following reason. [A]

A) Friction at the sleeve B) Weight of the spring C) Impossible to achieve 0 range D) High use of porter governors

117. The controlling force acting on the governor is also known as _____ [A]

A) Centripetal force B) Centrifugal force C) Governor effort D) Piston effort

118. Controlling force in the porter governors is due to which of the following components? [B]

A) Spring B) Weight of sleeve C) Weight of governor D) Piston effort

119. Which of the following quantities cannot be examined from controlling force diagram? [D]

A) Sensitivity B) Stability C) Effect of friction D) Power of governor

120. When the speed of the governor decreases, which of the following effect does friction causes? [A]

A) Prevents downward movement of sleeve B) Prevents upward movement of sleeve C) Prevents radial outward movement of balls D) Increases downward movement of sleeve

121. A disc is spinning with an angular velocity? rad/s about the axis of spin. The couple applied to the disc causing precession will be [D]

A) 1/2Iω2 B) Iω2 C) 1/2 Iω ωp D) Iω ωp

122. A disc spinning on its axis at 20 rad/s will undergo precession when a torque 100 N-m is applied about an axis normal to it at an angular speed, if mass moment of inertia of the disc is the 1 kg-m2 [B]

A) 2 rad/s B) 5 rad/s C) 10 rad/s D) 20 rad/s

123. The engine of an aeroplane rotates in clockwise direction when seen from the tail end and the aeroplane takes a turn to the left. The effect of the gyroscopic couple on the aeroplane will be [A]

A) to raise the nose and dip the tail B) to dip the nose and raise the tail C) to raise the nose and tail D) to dip the nose and tail

124. The air screw of an aeroplane is rotating clockwise when looking from the front. If it makes a left turn, the gyroscopic effect will [B]

A) tend to depress the nose and raise the tail B) tend to raise the nose and depress the tail C) tilt the aeroplane D) none of the mentioned

125. The rotor of a ship rotates in clockwise direction when viewed from the stern and the ship takes a left turn. The effect of the gyroscopic couple acting on it will be [C]

A) to raise the bow and stern B) to lower the bow and stern C) to raise the bow and lower the stern D) to lower the bow and raise the stern

126. If the sleeve lift is 80 mm and Power generated by the governor is 6 N-m, then find the mean effort. [A]

A) 7.5 N B) 15 N C) 20 N D) 30 N

127. . In an automobile, if the vehicle makes a left turn, the gyroscopic torque [A]

A) increases the forces on the outer wheels B) decreases the forces on the outer wheels C) does not affect the forces on the outer wheels D) none of the mentioned

128. The axis of precession is _____ to the plane in which the axis of spin is going to rotate. [B]

A) parallel B) perpendicular C) spiral D) none of the mentioned

129. The steering of a ship means [B]

A) ship up and down in vertical plane about transverse axis B) ship in a curve towards right or left, while it moves forward C) rolling of a complete ship side-ways D) none of the mentioned

130. The rotor of a ship rotates in clockwise direction when viewed from stern and the ship takes a left turn. The effect of gyroscopic couple acting on it will be [C]

A) to raise the bow and stern B) to lower the bow and stern C) to raise the bow and lower the stern D) to raise the stern and lower the bow

131. When the pitching of a ship is upward, the effect of gyroscopic couple acting on it will be [A]

A) to move the ship towards star-board B) to move the ship towards port side C) to raise the bow and lower the stern D) to raise the stern and lower the bow

132. Calculate the moment of inertia and radius of gyration of a solid sphere of mass 10 kg and diameter 6.5m about its centroidal axis. [A]

A) 2.055 m B) 3.055 m C) 4.055 m D) 5.055 m

133. Calculate the work done per minute by a punch tool making 20 working strokes per min when a 30 mm diametre hole is punched in 5 mm thick plate with ultimate shear strength og 450 Mpa in each stroke. [A]

A) 10.69 kNm B) 20.69 kNm C) 30.69 kNm D) 40.69 kNm

134. The graph plotted between the controlling force of the governor and Radius of rotation is known as _____ [A]

A) Controlling force diagram B) Radius of rotation diagram C) Governor diagram D) Sensitivity diagram

135. The relation between overturning couple and height of centre of gravity is given by_____ [A]

A) Co = Fcxh B) Co = Mv2xh/R C) Co = Mv2 * (h/R)2 D) Co = Mv2 * h/R2

136. In order to maintain contact between inner wheel and ground the sum of vertical reactions at each of the outer and inner wheels should be less than_____ [C]

A) W B) W/2 C) W/4 D) W/3

137. Let x be the track width of the vehicle, then which of the following expression is correct for vertical reaction Q at the two outer or inner wheels? [A]

A) Q = (Mv2. h)/ (R.x) B) Q = (Mv2)/ R C) Q = Mv2. x/ (R.h) D) Q = (Mv2)/ (x)

138. The overturning couple acting on the four wheeler vehicle is balanced by which of the following forces? [C]

A) Centripetal force B) Centrifugal force C) Vertical reactions D) Horizontal reactions

139. Assuming that a vehicle is taking a left turn, The gyroscopic couple acting on the vehicle has a tendency to _____ the inner wheels and ____ the outer wheels. [B]

A) Press, Lift B) Lift, Press C) Press, Press D) Lift, Lift

140. Which of the following factor is not responsible for the stability of a 4 wheel vehicle while negotiating a turn? [A]

A) Pitching B) Reaction due to weight of Vehicle C) Effect of Gyroscopic couple due to Wheel D) Effect of Gyroscopic Couple due to Engine

141. Which of the following quantity represent the gear ratio “G” for a 2 wheeler vehicle? (w: wheels, e: engine, R: radius of track, rw: radius of wheels & I: moment of inertia) [B]

A) ωw / ωe B) ωe / ωw C) rw/ R D) Ie/ Iw

142. Which of the following is correct regarding angle of heel? [A]

A) inclination of the vehicle to the vertical for equilibrium B) inclination of the vehicle to the horizontal for equilibrium C) angle between the axis of gyroscope couple and horizontal D) angle between the axis of spin couple and axis of precession

143. When is the positive sign used for the expression of gyroscopic couple? [C]

A) Centre of gravity is lower than the centre of vehicle B) When the engine is rotating in the opposite direction as that of wheels C) When the engine is rotating in the same direction as that of wheels D) Centre of gravity is higher than vehicle centre

144. Balancing couple is given by _____ (θ: angle of heel [B]

A) m.g.h cos θ B) m.g.h sin θ C) m.g.h D) (m.v2).h/R

145. Which of the following is true regarding overturning couple? [A]

A) sum of gyroscope couple and centrifugal couple
B) product of gyroscope couple and centrifugal couple
C) difference of gyroscope couple and centrifugal couple
D) ratio of gyroscope couple and centrifugal couple

146. What is the relation between overturning couple and balancing couple for the stability of vehicle? [D]

A) Independent of each other
B) Overturning couple is greater
C) Balancing couple is greater
D) Equal to each other

147. A device which consists of a wheel or disc mounted so that it can spin rapidly about an axis which is itself free to alter indirection is called [B]

A) telescope
B) gyroscope
C) ammeter
D) voltmeter

148. In an automobile, if the vehicle makes a left turn, the gyroscopic torque [A]

A) increases the force on outer wheels
B) decreases the force on outer wheels
C) does not affect the forces on the outer wheels
D) none of the mentioned

149. The point where whole weight may be assumed to act is called _____ [C]

A) Centre of mass
B) Centre of weight
C) Centre of gravity
D) Centre of acceleration

150. Which of the following retain their relative positions even when they move under the action of an external force? [C]

A) Rotation body
B) Stationary body
C) Rigid body
D) A body in equilibrium

151. The essential condition of placing the two masses, so that the system becomes dynamically equivalent is _____.where l1 and l2 = Distance of two masses from the center of gravity of the body, and kG = Radius of gyration of the body. [A]

A) l1.l2 = kG2
B) l1.l2 = kG
C) l1 = kG
D) l2 = kG

152. The net force acting on the crosshead pin is known as _____. [C]

A) crank pin effort
B) crank effort
C) piston effort
D) shaft effort

153. In a horizontal engine, reciprocating parts are accelerated when the piston moves from _____. [A]

A) TDC to BDC
B) BDC to TDC
C) midway to TDC
D) BDC to midway

154. In a horizontal engine, reciprocating parts are retarded when the piston moves from _____. [B]

A) TDC to BDC
B) BDC to TDC
C) midway to TDC
D) BDC to midway

155. Correction couple is applied when masses are placed arbitrarily and to maintain _____. [B]

A) static equilibrium B) dynamic equilibrium C) stable equilibrium D) unstable equilibrium

156. The correction couple does not depend on _____. [D]

A) distance between arbitrary masses B) distance between the two masses for a true dynamically equivalent system C) radius of gyration of the equivalent system D) distance between fixed masses

157. Force which does not act on the connecting rod is _____. [D]

A) weight of connecting rod B) inertia force of connecting rod C) radial force D) Coriolis force

158. If the mass of the ball is 25 kg and the controlling force is 450 N with an angular velocity of 150 rpm, find the radius. [B]

A) 7.2 cm B) 7.9 cm C) 8.3 cm D) 12.3 cm

159. Controlling force in the Hartnell governors is due to which of the following components? [B]

A) Weight of balls B) Weight of sleeve C) Spring D) Piston effort

160. If F=m.ω2.r represents the centrifugal force then which of the following expressions represents controlling force. [D]

A) F B) 2F C) -2F D) -F