3-1-2 ole 2010

DOM

1. In a vibrating body under the conditions of resonance, the phase angle will be _____ :->0^0
2. A vibrating system with damping factor unity is _____ :->Over damped
3. Critical speed of a shaft in revolutions per second as compared to natural frequency of transverse vibration is _____ :->More
4. Critical speed of a shaft depends on its _____ :->Eccentricity
5. The speed at which the rotating shaft ends to vibrate violently in transverse direction, is known as _____ :->Shirling speed
6. When the phase difference between displacement and centrifugal force is 180^0, the shaft is rotating at a speed which as compared to critical speed is _____ :->Less
7. When the phase difference between displacement and centrifugal force is 0^0, the shaft is rotating at a speed which as compared to critical speed is _____ :->Same
8. At critical speed, the shaft _____ :->Runs smoothly
9. A shaft having one end fixed and a disc oscillating freely at the other end. With increse in the shaft stiffness, the natural frequency of vibrations will _____ :->Increase
10. When a body vibrates under the influence of external force, it is said to have _____ :->Forced vibration
11. When no external force acts on a body and the body vibrates with natural frequency, it is said to have _____ :->Free vibration
12. The frequencies of vibration as a result of free vibrations of the system are known as _____ :->Natural frequencies
13. The number of cycle of motion completed in a unit interval of time is known as _____ :->Frequency
14. The motion completed in time interval of a period is known as _____ :->Cycle
15. The internal of time taken by the motion to repeat itself is called _____ :->Period
16. If m is mass, S is stiffnes and δ is static deflection of the body, then the natural frequency of free longtudinal vibrations is given by _____ :-> $\frac{4.985}{\sqrt{\delta}}$
17. A circular disc of moment of inertia I is attached to the lower end of an elastic vertical shaft. If the mass of the shaft is small and shaft has torsional vibrations of the disc in rad/sec. will be equal to _____ :->$\sqrt{\frac{K}{I}}$
18. For forced damped vibration system, the vibration isolation is possible only when _____ :->$\frac{\omega}{\omega_n} > \sqrt{2}$
19. The transmissibility is same for all values of damping factors at frequency ratio $\left(\frac{\omega}{\omega_n}\right)$of _____ :->$\sqrt{2}$
20. Damping is beneficial only when _____ :->$\left(\frac{\omega}{\omega_n}\right) > \sqrt{2}$
21. In damped force vibration systems _____ :->The spring force vector acts in the direction opposite the displacement
22. For damping factor ζ = 0 and frequency ratio $\frac{\omega}{\omega_n} > \sqrt{2}$, the transmissibility is _____ :->$\phi = \tan^{-1}\frac{C\omega^2}{(K-m\omega^2)}$
23. In forced damped vibration system the impressed force lags behind the displacement vector by _____ :->$\phi = \tan^{-1}\frac{C\omega}{(K-m\omega^2)}$
24. In forced damped vibration system the excitation force lags behind the displacement vector by _____ :->$\phi = \tan^{-1}\frac{C\omega}{(K-m\omega^2)}$
25. In damped free vibration system _____ :->The spring force vector acts in the diraction opposite the displacemant

26. There are n rotors mounted on the shaft and when subjected to torsional vibration there will be _____ :->(n-1)nodes
27. Three rotors connected by shafts when subjected to torsional vibration will have _____ :->Two nodes
28. The two rotors connected by a shaft when subjected to torsinal vibrations will have _____ :->One node
29. Natural frequency of transverse vibration of a shaft carrying load at the center of the span is _____ :->$f_n = \frac{4.9 \times 7}{\sqrt{\delta}}$
30. For shaft speed less than the critical speed the phase difference between displacement and centrifugal force is _____ :->0^0
31. For shaft speed more than critical speed the phase difference between displacement and centrifugal force is _____ :->180^0
32. When heavy rotating massses are connect by a shaft and equal and opposite torques are applied to these masses (rotors) _____ :->The rotors vibrate torsionally in the oppsite direction
33. Two heavy rotating masses are connected by shaft of non-uniform cross-section with lengths l_1, l_2, l_3 and l_4 with corresponding shaft diameter d_1, d_2, d_3 and d_4. This system can be reduced to torsionally equlivalent system with uniform diameter d_1 of the shaft and equivalent length of shaft equal to _____ :->$l_1 + l_2\left(\frac{d_1}{d_2}\right)^4 + l_3\left(\frac{d_1}{d_3}\right)^4 + l_4\left(\frac{d_1}{d_4}\right)^4$
34. The critical speed of the shaft carrying a mass m at the centre of the span is given by _____

    Where S = Stiffness of the shaft in transverse direction
    m = mass attached to the shaft

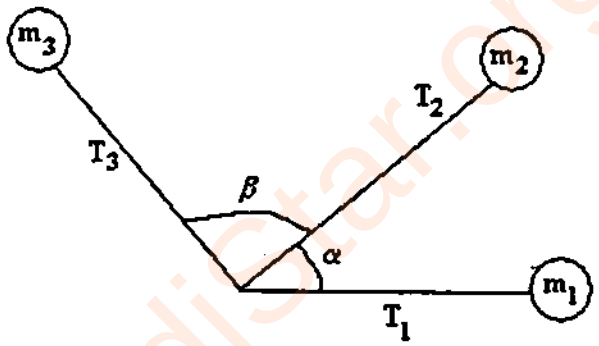
    δ = Static transverse deflection of the shaft due to mass m :->$\omega_c = \sqrt{\frac{S}{m}}$
35. In a spring mass system of mass m and stiffness K, the ends of the spring are securely fixed and mass is attached to intermediate point of spring. The natural frequency of longitudinal vibration of the system _____ :->is minimum when the mass is attached to the mid-point of the spring
36. The natural frequency of a system is function of _____ :->The stiffness of the system
37. If the spring mass system with m and spring stiffness K is taken to very high altitude, the natural frequency of longitudinal vibrations _____ :->Remains unchanged
38. The whirling speed of a rotating shaft carrying a mass m at the centre is _____ :->Is equal to natural frequency of transverse vibration of the system
39. A mass of M is attached to a spring whose upper end is fixed. The mass and stiffness of the spring are m and K respectively. The natural frequency of the spring mass system would be _____ :->$f_n = \frac{1}{2\pi}\sqrt{\frac{3K}{3M+m}}$
40. Rotating shafts tend to vibrate violently in transverse directions at certain speed. This speed is called _____ :->Whipping speed
41. The equation of motion of free vibration of the spring mass system with viscous damping is given by _____ :->$f_n = \frac{1}{2\pi}\sqrt{\frac{K_1 K_2}{(K_1+K_2)m}}$
42. The eqation of motion for free vibration of spring mass system without damping is given by _____

    Where C = Viscous damping Coefficient
    m = mass of the vibrating body
    K = spring stiffness
    F sin ωt = harmonic exciting force :->$\frac{d^2x}{dt^2} + \frac{K}{m}x = 0$
43. In the spring mass system, if the mass of the system is doubled with spring stiffness halved, the natural frequncy of longitudinal vibration _____ :->Is halved
44. When the frequency of external exciting force is equal to the natural frequency of vibration of the system _____ :->The amplitude of vibration is very large
45. Resonance is a phenomenon when the frequency of the external exciting force is _____ :->Same as the natural frequency of the system

46. The interval of time taken by a vibrating body to complete a cycle is called _____ :->Period
47. Two springs of stiffness K_1 and K_2 are connected in series and mass 'm' is attached to it. The natural frequency of the longitudinal vibration will be _____ :->$f_n = \frac{1}{2\pi}\sqrt{\frac{K_1 K_2}{(K_1+K_2)m}}$
48. In a spring mass system, the static deflection caused by mass 'm' in spring of stiffness 'K' is 'δ'. The natural period of vibration is _____ :->$T = 2\pi\sqrt{\frac{m}{K}}$
49. In a spring mass system, the static deflection caused by mass 'm' in spring of stiffness 'K' is 'δ'. The natural frequency of free longitudinal vibration of the system will be _____ :->$f_n = \frac{1}{2\pi}\sqrt{\frac{g}{deflm}}$
50. The principle of direct and reverse cranks is readily applicable to _____ :->Partial primary balance
51. Hammer blow occur when the c.g. of the balance weight is _____ :->Directly above (or) blow the wheel centre
52. In balancing of reciprocating cylinders, the resultant unbalanced force will be minimum when _____ _____ of the reciprocating masses are balanced by rotating masses :->Half
53. It is safer to have the maximum unbalanced force _____ :->Perpendicular to the line of stroke
54. In locomotives, the effect of secondary forces is proportional to weight of reciprocating parts transferred to rotational mass at a radius of _____ :->$\frac{r^2}{4l}$
55. In locomotives, the ratio of length of connecting rod to crank radius is kept very large in order to _____ _____ :->Minimise the effect of secondary forces
56. In partial balancing of locomotives, the maximum variation of tractive effort in Newtons _____ _____ :->$\frac{\sqrt{2}}{3}mw^2r$
57. If the ratio of the length of connecting rod to the crank radius increaes _____ :->Secondary unbalanced forces decrease
58. In locomotives, the limiting speed to prevent lifting of wheel from the rail is _____ :->$\omega = \left(\frac{w}{mr}\right)^{0.5}$
59. A balance mass of value $\frac{2}{3}$m is placed diametrically opposite to the crank at crank radius r. The unbalance force normal to the line of stroke of reciprocating engine is _____ :->$\frac{2}{3}mw^2r\sin\theta$
60. The resultant unbalanced force is minimum in reciprocating engines _____ :->When half the reciprocating masses are balanced by rotating masses
61. A balance mass of value $\frac{2}{3}$m is placed diametrically opposite to the crank at crank radius r. The resultant unbalanced force at any instant of the reciprocating engine is _____ :->$mw^2r\left(\frac{1}{9}\cos^2\theta + \frac{4}{9}\sin^2\theta\right)^{0.5}$
62. Swaying couple is resisted by _____ :->Side pressure between the flanges of the wheels
63. A balance mass of value $\frac{2}{3}$m is placed diametrically opposite to the crank at crank radius r. The unbalance force along the line of stroke of a reciprocating engine is _____ :->$\frac{1}{3}mw^2r\cos\theta$
64. In order to balance the reciprocating mass of reciprocating engine _____ :->Primary couples must balance
65. The frequency of secondary force as compared to primary force for ratio of connecting rod length to crank radius of 4 is _____ :->Twice
66. Inertia force due to mass of reciprocating parts of a reciprocating engine is given by _____ :->$\frac{W}{g}\omega^2 r\left[\cos\theta + \frac{\cos 2\theta}{n}\right]$
67. The acceleration of the piston of a reciprocating engine is given by _____ :->$f_p = w^2r\left(\cos\theta + \frac{r}{l}\cos 2\theta\right)$
68. In locomotives, the effect of hammer blow can be reduced by _____ :->Using two (or) three pairs of wheels couples together
69. In locomotives, the effect of hammer blow is counteracted by _____ :->Dead weight of the engine
70. Hammer blow in locomotives causes _____ :->Tendency to lift wheels from rails

71. In locomotives, the maximum value of unbalanced force perpendicular to the line of stroke is known as _____ :->Hammer blow
72. In locomotives, the resultant unbalanced force due to two cylinder along the line of stroke is known as _____ :->Tractive force
73. The maximum (or) minimum value of the tractive force is equal to _____ :-> pm frac{W}{g} omega
74. If W is weight of reciprocating parts, ω is angular speed of crank, r is radius of crank, θ is angle of inclination of crank with the line of stroke and n is ratio of length of connecting rod to radius of crank, then the force to accelerate the recirocating mass in reciprocating engine is equal to _____ :-> $\frac{W}{g}\omega^2 r\left[\cos\theta + \frac{\cos 2\theta}{n}\right]$
75. If W is weight of reciprocating parts, ω is angular speed of crank, r is radius of crank, θ is angle of inclination of crank with the line of stroke and n is ratio of length of connecting rod to radius of crank, then the secondary unbalanced force due to inertia of reciprocating parts in reciprocating engine is equal to _____ :-> $\frac{W}{g}(1-C)\omega^2 r(\cos\theta - 1)$
76. In locomotives, the swaying couple is caused due to _____ :->Primary disturbing force
77. In locomotives, the resultant unbalanced force is minimum when _____ :->Half the reciprocating masses are balanced by rotating masses
78. The swaying couple is maximum (or) minimum when the line of inclination of crank with the line of stroke is equal to _____ :->225^0 to 45^0
79. In locomotives, swaying couple is caused due to _____ :->Unbalanced primary force acting at a distance between the line of stroke of the cylinders
80. The maximum and minimum value of swaying couple is equal to _____ :-> $\frac{W}{g}(1-C)\omega^2 r(\cos\theta - \sin\theta)$
81. If W is weight of reciprocating parts, C is fraction of reciprocating parts per cylinder, r is radius of crank and θ is angle of inclination of crank to the line of stroke, then for two cyliner locomotives having their cranks at 90^0 to each other, the tractive force is equal to _____ :-> $\frac{W}{g}(1-C)\omega^2 r(\cos\theta - \sin\theta)$
82. Tractive force will be maximum (or) minimum, when the angle of inclination of crank with the line of stroke is equal to _____ :->180^0 to 225^0
83. In locomotives, with two cylinders, the cranks of two cylinders are placed at 90^0 to each other to _____ :->Minimise the effect of secondary forces
84. If in locomotices, the ratio of length of connecting rod to the crank radius is very large, then effect of _____ :->Secondary forces is minimum
85. Partial balancing of reciprocating parts in locomotive produces _____ :->Hammer blow
86. In a reciprocating engine, unbalanced reciprocating masses are generally _____ :->Two-Third
87. In one revolution of crank, the primary unbalanced force is maximum _____ :->Twice
88. Most of the engines generally do not require balancing of _____ :->Secondary couples
89. Secondary unbalance force is maximum, when the angle of inclination of crank with the line of stroke is _____ :->180^0
90. When the angle of inclination of the crank with the line of stroke is 0^0 (or) 180^0, the primary unbalanced force is _____ :->Maximum
91. Unbalanced force due to reciprocating mass _____ :->Varies in magnitude only
92. Partial balancing means balancing _____ :->Partially the reciprocating mass
93. Dynamically unbalanced mass in rotating machine causes _____ :->Vibrations
94. Primary unbalanced force as compared to secondary unbalanced force is _____ :->n times
95. In reciprocating engines, the primary forces are _____ :->Partially balanced
96. To balance the reciprocating masses _____ :->Primary forces must balance
97. In receiprocating engines, the ratio of primary to secondary force is _____ :-> $\frac{n\cos\theta}{\cos 2\theta}$
98. If W is weight of reciprocating parts, w is angular speed of crank, r is radius of crank, θ is angle of inclination of crank with the line of stroke and n is ratio of length of connecting rod to radius of crank, then the primary unbalanced force due to inertia of reciprocating parts in reciprocating engines is equal to _____ :-> $\frac{W}{g}\omega^2 r\cos\theta$

99. The function of balancing a prime mover is to _____ :->Eliminate partially (or) completely the effects due to resultant force and couple
100. Rotating parts are unbalanced due to _____ :->Unmachined portions of casting
101. For complete balancing of the several revolving masses in different planes, the _____ :->Resultant force must be zero
102. For dynamic balancing of a shaft _____ :->The net couple due to dynamic force acting on the shaft is equal to zero
103. For static balancing of a shaft _____ :->The net dynamic force acting on the shaft is equal to zero
104. The balance masses are introduced in the plane parallel to the plane of rotation of the disturbing mass. To obtain complete dynamic balance, a minimum number of balance masses to be introduced is _____ :->Two
105. A mass is attached to a shaft rotating at ω rad/sec at radius r from axis of shaft is balanced by mass B at radius b from the axis of shaft. If the speed of the shaft is doubted for balance, the value of mass B is _____ :->Un affected
106. Reference Figure (a) . It shows three masses m_1, m_2 and m_3 which are revolving in the same plane at radii r_1, r_2 and r_3 respectively. The relative angular positions are shown by angles α and β. The mass placed at radius b and 0 measured from mass m_1 would be _____



Figure(a)

:->$B = \frac{m_1 r_1 + m_2 r_2 \sin\alpha + m_3 r_3 \sin(\alpha+\beta)}{b \sin\theta}$

107. A mass is attached to shaft rotating at ω rad/sec at radius r from axis of shaft is balanced by mass B at radius b from axis of shaft, in the same plane of rotation. The necessary conditon for balancing is _____ :->$mr = Bb$
108. The term ``effort of governor" refers to _____ :->Force acting on sleeve for given % change of speed
109. For same lift of sleeve, range of speed of proell governor as compared to porter governor is _____ :->More
110. For spring controlled governors the controlling force curve would be _____ :->Straight line
111. The function of a governor is to _____ :->Adjust variation of speed by varying the input to the engine
112. The work done at the sleeve for a given percentage change of speed, is _____ :->Power of the governor
113. The mean force required to raise the sleeve from one equilibrium position to the other equilibrium position is called _____ :->Effort of the governor
114. The horizontal distance from the axis of rotation to the centre of the ball mass at any speed is called _____ :->Radius of rotation

115. The speed at which the forces on balls, arms and the sleeve are in complete equilibrium and there is no movement of the sleeve up or down, is called _____ :->Equilibrium speed
116. Pickering governor could be classified as _____ :->Spring controlled type
117. A proel governor could be classified as _____ :->Dead weight type
118. For Hartnell governor, neglecting the gravitational effects, on falls and sleeve, the effort will be given by _____ :->C S
119. Governor power is defined as _____ :->Product of governor effort and sleeve lift
120. Governor effort is defined as _____ :->Force applied for the total working range of speed
121. The controlling force curve is a relationship between _____ :->Controlling force and radius of rotation
122. The main objective of controlling force is to _____ :->Determine stability of governor
123. The power of a porter governor when arms are equal and inclined at same angle to the axis is given by _____ :->$P = \frac{4c^2}{1+2c}(m+M)gh$
124. The effort of a porter governor with equal arms and same inclination with axis of rotation is given by _____
Where m = mass of balls, M = Mass of sleeve and C = Percentage speed increase :->$Q = (m+M)gc$
125. Governor which is Hunting is _____ :->Less stable
126. Isochronous governor is _____ :->Less stable
127. If the ball masses of a governor have same speed for all radii of rotation, it is said to be _____ :->Isochronous
128. If the ball masses of a governor occupy a definite specified position for each speed in the working, it is said to be _____ :->Stable
129. Sensitivity of the governor is expressed as _____
Where N_1 = Maximum speed, N_2 = Minimum speed :->$2\left(\frac{N_1-N_2}{N_1+N_2}\right)$
130. The spring rate of Hartnell governor is _____ :->$P = \frac{S_1-S_2}{x}$
131. For Hartnell governor, the lift is expressed as _____ :->$x = (r_1 - r_2)\frac{b}{a}$
132. In a Hartnell governor, the mass of each ball is 2.5 Kg. the maximum and minimum speed of rotation are 10 rad/sec and 8 rad/sec. The maximum and mininum radii of rotation are 20 and 14cm respectively. The lengths of veritcle and horizontal arms of bell crank lever are 20 cm and 10 cm respectively. Neglecting the gravitational effects of ball and sleeve, the lift of sleeve will be _____ :->3 cm
133. The spring rate of Hartnell Governor is given by _____
Where F_1 = Force at maximum radius
--------- F_2 = Force at minimum radius :->$P = 2\left(\frac{a}{b}\right)^2 \frac{F_1-F_2}{r_1-r_2}$
134. Spring force exerted on the sleeve of a Hartnell governor, neglecting gravitational affects of ball and sleeve is _____
Where S = Spring force, m = mass of ball, r = radius of rotation, a = vertical arms, b = horizontal arms of bell crank lever :->$S = 2mw^2r \times \frac{a}{b}$
135. For the same lift of sleeve, the range of speed of proel governor as compard to that for porter governor is _____ :->less
136. The spring loaded governor as compared to gravity controlled governors _____ :->can operate at higher speeds
137. The proel governor _____ :->rqeuires smaller size masses than porter governor for same speed
138. With the increase of governor speed _____ :->radius of rotation increases but height of governor decreases
139. The frictional resistance at the sleeve of a governor _____ :->decreases sensitivity of governor

140. In porter governor with arms equal and pivoed at equal distance from axis of rotation, and considering friction, the heightof the governor when speed is decreasing is given by _____ :->$h = \left[\frac{mg+Mg-f}{m}\right]\frac{1}{\omega^2}$

141. In porter governor with arms equal and pivoted at equal distance from axis of rotation, and considering friction, the height of the governor when speed is increasing is given by _____ Where f = Friction force. :->$h = \left[\frac{mg+Mg+f}{m}\right]\frac{1}{\omega^2}$

142. The height of a Watt's governor is expressed as _____ :->$h = \frac{g}{\omega^2}$

143. The centrifugal governors as compared to inertia and flywheel governors are _____ :->less sensitive and more simple

144. Which of the following is gravity controlled type governor _____ :->Porter

145. The speed of the Watt's governor for a height of 9.81 cm is equal to _____ :->10 - rad/sec

146. Practically the sensitiveness of watt and porter governor are _____ :->Same

147. If the controlling force of a spring controlled governor decreases with increase in radius of rotation then governor is said to be :->Unstable

148. The height of porter governor with equal arms pivoted at equal distance from axis of rotation is expressed as _____
Where m = mass of balls of the governor
M = Mass of sleeve of the governor
N = r.p.m. :->$91.2\left[\frac{m+M}{m}\right]\frac{g}{N^2}$

149. Choose the Correct statement: _____ :->The governor maintains the speed of the engine within prescribed limits for varying torque output conditons

150. The height of Watt's governor is proportional to _____ :->$\frac{1}{N^2}$

151. Which of the following is spring controlled governor _____ :->Wilson-hartnell

152. Sensitiveness of governor is defined as _____ :->$\frac{Range\ of\ Speed}{Mean\ Speed}$

153. The governor used in gramophone is of the following type _____ :->pickering

154. If the controlling force of a governor increases with increase in speed, the governor is said to be _____ :->Insensitive

155. The quality of a governor can be judged by its _____ :->Effort and power .

156. A porter governor could be classified as _____ :->Dead weight type governor

157. Hartnell governor could be classified under the head of _____ :->Centrifugal type governor