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| Q 1. **A rigid body possesses\_\_\_\_\_degrees of freedom.** | |
| a)One | b) Two |
| c) Four | d) Six |
| Correct answer: d |  |
| Q 2. **Which of the following is an open pair?** | |
| a) Journal bearing | b) Ball and Socket joint |
| c) Leave screw and nut | d) None of the above |
| Correct answer: c |  |
| Q 3. **Which of the following is a higher pair?** | |
| a) Turning pair | b) Screw pair |
| c) Belt and pulley | d) None of the above |
| Correct answer: c |  |
| Q 4. **A higher pair has\_\_\_\_\_\_\_\_\_\_.** | |
| a)Point contact | b)Surface contact |
| c)No contact | d)Non of the above |
| Correct answer: a |  |
| Q 5. **In a ball bearing, ball and bearing forms a** | |
| a)Turning pair | b)Rolling pair |
| c)Screw pair | d)Spherical pair |
| Correct answer: b |  |
| Q 6. **Transmission angle is the angle between** | |
| a)Input link coupler | b)Input link and fixed link |
| c)Output link and coupler | d)Output link and fixed link |
| Correct answer: c |  |
| Q 7. **Which of the following is an inversion of Single slider crank chain?** | |
| a) . Beam engine | b) Rotary engine |
| c) Oldham’s coupling | d) Elliptical trammel |
| Correct answer: b |  |
| Q 8. **. \_\_\_\_\_\_\_\_ is an inversion of Double slider crank chain.** | |
| a) Coupling rod of a locomotive | b) Scotch yoke mechanism |
| c) Hand pump | d) Reciprocating engine |
| Correct answer:b |  |
| Q 9. **. A ball and a socket forms a** | |
| a) Turning pair | b) Rolling pair |
| c) Screw pair | d) Spherical pair |
| Correct answer: d |  |
| Q 10. **The Kutzbach criterion for determining the number of degrees of freedom (n) is (where l = number of links, j =**  **number of joints and h = number of higher pairs)** | |
| a) n = 3(l-1)-2j-h | b) n = 2(l-1)-2j-h |
| c) n = 3(l-1)-3j-h | d) n = 2(l-1)-3j-h |
| Correct answer: a |  |
| Q 11. **. A fixed gear having 200 teeth is in mesh with another gear having 50 teeth. The two gears are connected by**  **an arm. The number of turns made by the smaller gear for one revolution of arm about the centre of bigger gear**  **is** | |
| a) 2 | b) 4 |
| c) 3 | d) None of the above |
| Correct answer: b |  |
| Q 12. **Which gear is used for connecting two coplanar and intersecting shafts?** | |
| a) Spur gear | b) Helical gear |
| c) Bevel gear | d) None of the above |
| Correct answer: c |  |
| Q 13**. Module of a gear is** | |
| a) D/T | b) T/D |
| c) 2D/T | d) 2T/D |
| Correct answer: a |  |
| Q 14. **. Length of arc of contact is given by** | |
| a) Arc of approach - Arc of recess | b) Arc of approach + Arc of recess |
| c) Arc of approach / Arc of recess | d) Arc of approach x Arc of recess |
| Correct answer: b |  |
| Q 15. **. The type of gears used to connect two non parallel and non intersecting shafts is** | |
| a) Spur gear | b) Helical gear |
| c) Bevel gear | d) Spiral gear |
| Correct answer: d |  |
| Q 16. **To connect two parallel and coplanar shafts the following type of gearing is used** | |
| a) Spur gear | b) Bevel gear |
| c) Spiral gear | d) None of the above |
| Correct answer: a |  |
| Q 17. **In which of the following type of gear train the first gear and the last gear are co-axial.**  a. b.  c d.  (Ans:c) | |
| a) Simple gear train | b) Compound gear train |
| c) Reverted gear train | d) None of the above |
| Correct answer: c |  |
| Q 18. **. Which gear train is used for higher velocity ratios in a small space?** | |
| a) Simple gear train | b) Compound gear train |
| c) Reverted gear train | d) Epicyclic gear train |
| Correct answer: d |  |
| Q 19. **Which type of gear train is used in clock mechanism to join hour hand and minute hand?** | |
| a) Simple gear train | b) Compound gear train |
| c) Reverted gear train | d) Epicyclic gear train |
| Correct answer: d |  |
| Q 20. **Which type of gearing is used in steering system of an automobile?** | |
| a) Rack and pinion | b) Worm and wheel |
| c) Spiral gears | d) None of the above |
| Correct answer: a |  |
| Q 21. **The couple will balance one another couple when they are in the same plane and** | |
| a) Have unequal moments and their direction of rotation is opposite | b) Have equal moments and their direction of rotation is same |
| c) Have equal moments and their direction of rotation is opposite | d) None of the above |
| Correct answer: c |  |
| Q 22. **The frictional torque transmitted in a conical pivot bearing, considering uniform pressure is (Where R is the**  **radius of shaft, α is semi angle of the cone, μ is coefficient of friction, and W is the load on bearing)** | |
| a) (μWR cosecα)/2 | b) (3μWR cosecα)/4 |
| c) (2μWRcosecα)/3 | d) None of the above |
| Correct answer: |  |
| Q 23. **The friction circle is a circle drawn when a journal rotates in a bearing. Its radius depends upon the**  **coefficient of friction and** | |
| a) Angular velocity of journal | b) Magnitude of the forces on journal |
| c) Radius of journal | d) None of the above |
| Correct answer: |  |
| Q 24. **When the addenda on pinion and wheel is such that the path of approach and path of recess are the half of**  **their maximum possible value, then the length of path of contact is given by (where r is pitch circle radius of**  **pinion, R is the pitch circle radius of wheel and Φ is the pressure angle)** | |
| a) {(r2+R2)cosΦ}/2 | b) {(r+R)sinΦ}/2 |
| c) {(r+R)cosΦ}/2 | d) None of the above |
| Correct answer: |  |
| Q 25. **The ratio of height of porter governor (when length of arms and links are equal) to the height of watt governor**  **is (Where m is the mass of the ball and M is the mass of sleeve)** | |
| a) (m+M)/m | b) M/(m+M) |
| c) m/(m+M) | d) None of the above |
| Correct answer: |  |
| Q 26. **A governor is said to be isochronous when equilibrium speed of all radii of rotation of the balls with in the**  **working range** | |
| a) Is constant | b) Varies uniformly |
| c) Is not constant | d) None of the above |
| Correct answer: |  |
| Q 27. **The ratio of tension of two side of a flat belt is given by** | |
| a) e-μθ | b) eμθ |
| c) e x μ x θ | d) None of the above |
| Correct answer: |  |
| Q 28. **Crowning of a pulley is done to** | |
| a) Prevent the slipping of a belt | b) To increase the tension of a belt |
| c) To increase the angle of contact | d) None of the above |
| Correct answer: |  |
| Q 29. **The power transmitted by a belt drive is (T1=Tension on tight side, T2=Tension on slack side, where v = linear**  **velocity, ω = angular velocity)** | |
| a) (T1-T2) x v | b) (T1-T2) x ω |
| c) (T1-T2) / v | d) (T1-T2) /ω |
| Correct answer: |  |
| Q 30. **The number of Instantaneous centres in a mechanism is (where n is the number of links)** | |
| a) n(n-1)/2 | b) 2n(n-1)/3 |
| c) n(2n-1)/2 | d) 3n(n-1)/2 |
| Correct answer: |  |
| Q 31. **For L number of links in a mechanism, the number of possible inversions is equal** | |
| a) L-2 | b) L-1 |
| c) L | d) L+1 |
| Correct answer: |  |
| Q 32. **Oldham’s coupling is the inversion of** | |
| a) four bar mechanism | b) crank and lever mechanism |
| c) single slider crank mechanism | d) double slider crank mechanism |
| Correct answer: |  |
| Q 33. **. The tooth profile most commonly used in gear drives for power transmission is** | |
| a) A cycloid | b) An involute |
| c) An ellipse | d) A parabola |
| Correct answer: |  |
| Q 34. **. The radius of gyration of a solid disc type flywheel of diameter ‘D’ is** | |
| a) D | b) D/2 |
| c) D/√2 | d) (√3/2)D |
| Correct answer: |  |
| Q 35. **A Hartnell governor is a governor of the** | |
| a) inertia type | b) pendulum type |
| c) centrifugal type | d) dead weight type |
| Correct answer: |  |
| Q 36. **. A governor is said to be isochronous when the equilibrium speed for all radii of rotation of the balls within the**  **working range** | |
| a) is not constant | b) is constant |
| c) varies uniformly | d) has uniform acceleration |
| Correct answer: |  |
| Q 37. **In reciprocating engines primary forces** | |
| a) are completely balanced | b) are partially balanced |
| c) are balanced by secondary forces | d) cannot be balanced |
| Correct answer: |  |
| Q 38. **If a damping factor in a vibrating system is unity, then the system will** | |
| a) have no vibrations | b) be highly damped |
| c) be underdamped | d) be critically damped |
| Correct answer: |  |
| Q 39. **For steady state forced vibrations, the phase lag at resonance is** | |
| a) 0° | b) 45° |
| c) 90° | d) 180° |
| Correct answer: |  |
| Q 40. **. For spur with gear ratio greater than one, the interference is most likely to occur near the** | |
| a) pitch point | b) point of beginning of contact |
| c) point of end of contact | d) root of the tooth |
| Correct answer: |  |
| Q 41. **What is the number of instantaneous centres for an eight link mechanism?** | |
| a) 15 | b) 28 |
| c) 30 | d) 8 |
| Correct answer: b |  |
| Q 42. **The method of direct and reverse cranks is used in engines for** | |
| a) the control of speed fluctuations | b) balancing of forces and couples |
| c) kinematic analysis | d) vibration analysis |
| Correct answer: b |  |
| Q 43. **Oldham’s coupling is an inversion of the kinematic chain used in** | |
| a) Whitworth quick return mechanism | b) Elliptical trammel |
| c) Rotary engine | d) Universal joint |
| Correct answer: b |  |
| Q 44. **In balancing of 4-stroke in line engines, firing order helps to control the magnitude of** | |
| a) Primary forces only | b) Secondary forces only |
| c) Primary forces and primary couples only | d) Primary and secondary couples only |
| Correct answer: |  |
| Q 45. **Which one of the following statements in respect of involute profiles for gear teeth is not correct?** | |
| a) Interference occurs in involute profiles | b) Involute tooth form is sensitive to change in centre distance between the base circles. |
| c) . Basic rack for involute profile has straight line form | d) Pitch circle diameters of two mating involute gears are directly proportional to the base circle diameters. |
| Correct answer: |  |
| Q 46. **Which one of the following is an exact straight line mechanism using lower pairs?**  a. Watt’s mechanism b. Grasshopper mechanism  c. Robert’s mechanism d. Paucellier’s mechanism  (Ans:d)  **47.** | |
| a) | b) |
| c) | d) |
| Correct answer: |  |
| Q 47. **In a system subjected to damped forced vibrations, the ratio of maximum displacement to the static**  **deflection is known as** | |
| a) Critical damping ratio | b) Damping factor |
| c) Logarithmic decrement | d) Magnification factor |
| Correct answer: d |  |
| Q 48. **Consider the following statements:**  **Coriolis acceleration component appears in the acceleration analysis of the following planar mechanisms:**  a. Whitworth quick return mechanism  b. Slider crank mechanism  c. Scotch Yoke mechanism  Which of these statements is/are correct? | |
| a) 1, 2 and 3 | b) 1 and 2 |
| c) 2 and 3 | d) 1 only |
| Correct answer: |  |
| Q 49. **Consider the following mechanisms:**  1. Oscillating cylinder engine mechanism  2. Toggle mechanism  3. Radial cylinder engine mechanism  4. Quick return mechanism  **Which of the above are inversions of slider crank mechanism?** | |
| a) 1, 2 and 4 | b) 2, 3 and 4 |
| c) 1, 2 and 3 | d) 1, 3 and 4 |
| Correct answer: d |  |
| Q 50. **With usual notations for different parameters involved, the maximum fluctuations of energy for a flywheel is**  **given by** | |
| a) 2ECS | b) ECS/2 |
| c) 2ECS | d) 2E2CS |
| Correct answer: a |  |
| Q 51. **. Whirling speed of the shaft is the speed at which** | |
| a) Shaft tends to vibrate in longitudinal direction | b) torsional vibrations occur |
| c) shaft tends to vibrate vigorously in transverse direction | d) combination of transverse and longitudinal vibration occurs |
| Correct answer: c |  |
| Q 52. **The frictional torque transmitted in a flat pivot bearing, assuming uniform wear, is** | |
| a) μWR | b) ¾μWR |
| c) (2/3)μWR | d) ½μWR(Where μ = Coefficient of friction, W=Load over the bearing, R=Radius of bearing) |
| Correct answer: d |  |
| Q 53. **The velocity of sliding of meshing gear teeth is**  a. b. c. d.  (Ans:c)  **54.** | |
| a) (ω1 + ω2)y | b) (ω1/ω2)y |
| c) (ω1 x ω2)y | d) (ω1+ω2)/y  (Where ω1 and ω2 are angular velocities of meshing gears and ‘y’ is distance between point of contact and the pitch point) |
| Correct answer: c |  |
| Q 54. **A speed reducer unit consists of a double threaded worm of pitch = 11mm and a worm wheel of pitch**  **diameter = 84 mm. The ratio of output torque to the input torque is** | |
| a) 7.6 | b) 12 |
| c) 24 | d) 42 |
| Q 55. **Hammer blow** | |
| a) is the maximum horizontal unbalanced force caused by the mass provided to balance the reciprocating masses. | b) is the maximum vertical unbalanced force caused by the mass added to balance the reciprocating masses |
| c) varies as the square root of the speed | d) varies inversely with the square of the speed |
| Correct answer: b |  |
| Q 56. **A pulley and belt in a belt drive form a** | |
| a) cylindrical pair | b) turning pair |
| c) rolling pair | d) sliding pair |
| Correct answer: b |  |
| Q 57. **In a hydrodynamic journal bearing, there is**  a  b.  c.  d.  (Ans:b) | |
| a) . a very thin film of lubricant between the journal and the bearing such that there is contact between the journal and the  bearing | b) a thick film of lubricant between the journal and the bearing |
| c) no lubricant between the journal and the bearing | d) a forced lubricant between the journal and the bearing |
| Correct answer: b |  |
| Q 58. **58. The balancing weights are introduced in planes parallel to the plane of rotation of the disturbing mass. To**  **obtain complete dynamic balance, the minimum number of balancing weights to be introduced in different planes**  **is** | |
| a) 1 | b) 2 |
| c) 3 | d) 4 |
| Correct answer: b |  |
| Q 59. **. The unbalanced force in a single cylinder reciprocating engine is**  1. equal to inertia force of the reciprocating masses 2. equal to gas force  3. Always fully balanced  Which of the statement(s) is/are correct? | |
| a) 1 alone | b) 2 alone |
| c) 1 and 3 | d) 2 and 3 |
| Correct answer: |  |
| Q 60. **. Minimum number of teeth for involute rack and pinion arrangement for pressure angle of 20° is** | |
| a) 18 | b) 20 |
| c) 30 | d) 34 |
| Correct answer: a |  |