**Mechanisms and Dynamics of Machines**

1. In a coupling rod of a locomotive, each of the four pairs is a \_\_\_\_\_\_\_\_ pair.

A. Sliding

B. Turning

C. Rolling

D. Screw

2. A kinematic chain is known as a mechanism when

A. None of the links is fixed

B. One of the links is fixed

C. Two of the links are fixed

D. None of these

3. A ball and a socket forms a

A. Turning pair

B. Rolling pair

C. Screw pair

D. Spherical pair

4. Which of the following statement is correct as regard to the difference between a machine and a structure?

A. The parts of a machine move relative to one another, whereas the members of a structure do not move relative to one

another

B. The links of a machine may transmit both power and motion, whereas the members of a structure transmit forces only

C. A machine transforms the available energy into some useful work, whereas in a structure no energy is transformed into

useful work

D. All of the above

5. In a four-bar chain it is required to give an oscillatory motion to the follower for a continuous rotation of the crank. For the lengths of 50 mm of crank and 70 mm of the follower, determine theoretical maximum length of coupler. The distance between fixed pivots of crank and followers is

A. 95 mm

B. Slightly less than 95 mm

C. Slightly more than 95 mm

D. 45 mm

6. A rotor which is balanced statically but not dynamically is supported on two bearings L apart and at highspeed of the rotor, reaction on the left bearing is R. The right side of the bearing is shifted to a new position2L apart from the left bearing. At the same rotor speed, dynamic reaction on the left bearing in the new arrangement will

A. Remain same as before

B. Become equal to 2R

C. Become equal to

D. Become equal to

7. The relation apply only to kinematic chains in which lower pairs are used. This may be usedto kinematic chains in which higher pairs are used, but each higher pair may be taken as equivalent to

A. One lower pair and two additional links

B. Two lower pairs and one additional link

C. Two lower pairs and two additional links

D. Any one of these

8. A circle passing through the pitch point with its center at the center of cam axis is known as

A. Pitch circle

B. Base circle

C. Prime circle

D. Outer circle

9. Cylindrical cams can be classified as

A. Circular

B. Tangent

C. Reciprocating

D. None of the above

10. The pressure angle of a cam depends upon

A. Offset between centre lines of cam and follower

B. Lift of follower

C. Angle of ascent

D. All of the above

11. The size of cam depends upon

A. Base circle

B. Pitch circle

C. Prime circle

D. Pitch curve

12. The acceleration of a flat-faced follower when it has contact with the flank of a circular arc cam, is given by

A. ω2Rcos θ

B. ω2 (R − r1) cos θ

C. ω2 (R − r1) sin θ

D. ω2r1 sin θ

13. The acceleration of the reciprocating roller follower when it has contact with the straight flanks of the tangent cam, is given by

A. ω2 (r1r2) (1 − cos2θ)

B. ω2 (r1 + r2) (1 + cos2θ)

C. ω2 (r1 + r2)

D. ω2 (r1 − r2) (1 − sin2θ)

14. The velocity of a flat-faced follower when it has contact with the flank of a circular arc cam, is given by

A. ωRcos θ

B. ω(R − r1) cos θ

C. ω(R − r1) sin θ

D. ωr1 sin θ

15. Klein's construction can be used when

A. Crank has a uniform angular velocity

B. Crank has non-uniform velocity

C. Crank has uniform angular acceleration

D. Crank has uniform angular velocity and angular acceleration

16. For the same lift and same angle of ascent, a smaller base circle will give

A. A small value of pressure angle

B. A large value of pressure angle

C. There is no such relation with pressure angle

D. Something else

17. Klein's construction gives a graphic construction for

A. Slider-crank mechanism

B. Velocity polygon

C. Acceleration polygon

D. Four bar chain mechanism

18. For simple harmonic motion of the of follower, a cosine curve represents

A. Displacement diagram

B. Velocity diagram

C. Acceleration diagram

D. All of the above

19. A cam mechanism imparts following motion

A. Rotating

B. Oscillating

C. Reciprocating

D. All of the above

20. Which of the following mechanism is obtained from lower pair?

A. Gyroscope

B. Pantograph

C. Valve and valve gears

D. All of the above

21. Ackermann steering gear consists of

A. Sliding pairs

B. Turning pairs

C. Rolling pairs

D. Higher pairs

22. Davis steering gear consists of

A. Sliding pairs

B. Turning pairs

C. Rolling pairs

D. Higher pairs

23. The axis of precession is \_\_\_\_\_\_\_\_\_\_ to the plane in which the axis of spin is going to rotate.

A. Parallel

B. Perpendicular

C. Both A and B

D. None of these

24. If the pressure angle is \_\_\_\_\_\_\_\_\_\_, a reciprocating follower will jam in its bearings.

A. Small

B. Too small

C. Large

D. Too large

25. The Coriolis component of acceleration is taken into account for

A. Slider crank mechanism

B. Four bar chain mechanism

C. Quick return motion mechanism

D. All of these

26. A circular bar moving in a round hole is an example of

A. Incompletely constrained motion

B. Partially constrained motion

C. Completely constrained motion

D. Successfully constrained motion

27. The motion of a shaft in a circular hole is an example of

A. Completely constrained motion

B. Incompletely constrained motion

C. Successfully constrained motion

D. None of these

28. In a kinematic chain, a quaternary joint is equivalent to

A. One binary joint

B. Two binary joints

C. Three binary joints

D. Four binary joints

29. The direction of Coriolis component of acceleration is the direction

A. Of relative velocity vector for the two coincident points rotated by 90° in the direction of the angular velocity of the rotation of the link

B. Along the centripetal acceleration

C. Along tangential acceleration

D. Along perpendicular to angular velocity

30. A chain comprises of 5 links having 5 joints. Is it kinematic chain?

A. Yes

B. No

C. It is a marginal case

D. Data are insufficient to determine it

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