QUESTION BANK

Q 1. Which of the following statement is correct?	
a) For constant velocity ratio transmission between two gears, the common normal at the point of contact must always pass through a fixed point on the line joining the centers of rotation of gears	b) For involute gears, the pressure angle changes with the change in center distance between gears
c) The epicyclic gear trains involve rotation of at least one gear axis about some other gear axis.	d) All of the above
Correct answer: D	
Q 2. The working depth of a gear is the radial distance from the	
a) Pitch circle to the bottom of a tooth	b) Pitch circle to the top of a tooth
c) Top of a tooth to the bottom of a tooth	d) Addendum circle to the clearance circle
Correct answer: D	
Q 3. Crowning on pulleys helps	
a) In increasing velocity ratio	b) In decreasing the slip of the belt
c) For automatic adjustment of belt position so that belt runs centrally	d) Increase belt and pulley life
Correct answer: C	
Q 4. In automobiles the power is transmitted from gear box to differential through	
a) Bevel gear	b) Universal joint
c) Hooke's joint	d) Knuckle join
Correct answer: C	
Q 5. The Ackerman steering gear mechanism is preferred to the Davis steering gear mechanism, because	
a) Whole of the mechanism in the Ackerman steering gear is on the back of the front wheels	b)The Ackerman steering gear consists of turning pairs
c)The Ackerman steering gear is most economical	d)Both (A) and (B)
Correct answer: D	

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Q 6. Spur gear design normally begins with selecting this:	
a)Rack size	b)Tooth size
c)Gear size	d)Pitch diameter
Correct answer: D	
Q 7. The most common geometric form used in gears today is this:	
a)Involute profile	b)Convolute profie
c)Base circle	d)Spur circle
Correct answer: A	
Q 8. Gear teeth formed on a flat surface are called this:	
a)Pinion	b)Rack
c)Spur	d)Teeth
Correct answer: B	
Q 9. Inertia force acts	
a) Perpendicular to the acceleration force	b) Along the direction of acceleration force
c) Opposite to the direction of acceleration force	d) None of the above
Correct answer:C	
Q 10. In an engine, the work done by inertia forces in a cycle is	
a)Positive	b)Zero
c)Negative	d)None of these
Correct answer :A	
Q 11. The analysis of mechanism deals with	
a) the determination of input and output angles of a mechanism	b) the determination of dimensions of the links in a mechanism
c) the determination of displacement, velocity and acceleration of the links in a mechanism	d) none of the above
Correct answer: C	
Q 12. In a simple gear train, if the number of idle gears is odd, then the motion of driven gear will	
a)be same as that of driving gear	b)be opposite as that of driving gear
c)depend upon the number of teeth on the driving gear	d)none of the above

Correct answer: A	
Q 13. The train value of a gear train is	
a)equal to velocity ratio of a gear train	b)reciprocal of velocity ratio of a gear train
c)always greater than unity	d) always less than unity
Correct answer: B	
Q 14. When the axes of first and last gear are co-axial, then gear train is known as	
a)simple gear train	b)compound gear train
c)reverted gear train	d)epicyclic gear train
Correct answer: C	
Q 15. In a clock mechanism, the gear train used to connect minute hand to hour hand, is	
a) epicyclic gear train	b)reverted gear train
c)compound gear train	d)simple gear train
Correct answer: B	
Q 16. In a gear train, when the axes of the shafts, over which the gears are mounted, move relative to a fixed axis, is called	
a) Simple gear train	b)reverted gear train
c)compound gear train	d)epicyclic gear train
Correct answer: D	
Q 17. 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 18. 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 19. Module of a gear is	

a) D/T	b) T/D
c) 2D/T	d) 2T/D
Correct answer: a	
Q 20. 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 21. In which of the following type of gear train the first gear and the last gear are co-axial.	
a) a. Simple gear train	b) Compound gear train
c) Reverted gear train	d) None of the above
Correct answer: c	
Q 22. 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 23. In a gear train, when the axes of the shafts over which gears are mounted, move relative to a fixed axis, is called	
a) Simple gear train	b) Compound gear train
c) Reverted gear train	d) Epicyclic gear train
Correct answer: d	
Q 24. A flywheel is a device which controls	
a) the mean speed of rotation of the engine shaft over a long period of time	b) the speed variation caused by cyclic fluctuation of energy
c) the fluctuation of energy over a long period	d) the fuel supply to control the mean speed of the engine shaft
Correct answer: b	
Q 25. What are crank effort diagrams?	
a) Turning moment diagram is drawn on cartesian co-ordinates	b) Turning moment diagram is drawn on polar co-ordinates

c) Turning moment (T) is plotted against crank angle θ for various crank positions	d) All of the above
Correct answer: C	

SHORT AND LONG QUESTIONS

Q1. Define kinematic link,kinematic pair and kinematic chain.

Q2. Define terms machine and mechanism

Q3. Discuss binary, ternary and quarternary joints and relationship between them.

Q4. What is inversion of mechanism and explain the following inversions

i) Crank and slotted lever mechanism

ii) Whitworth quick return mechanism

iii) Oldham's couplings

iv) Scotch yoke mechanism

Q5. .A cam is to give following motion to a knife edge follower:

i) outstroke during 60° of cam rotation

ii) dwell for next 30° of cam rotation iii) return during next 60° of cam rotation

iv) dwell for next 210° of Cm rotation

The stroke of follower is 40mm and minimum radius of cam is 50mm. The follower mover with uniform velocity during both outstroke and return stroke and the axis of follower passes through the axis of cam shaft and when the axis of follower is offset by 20mm from the axis of cam.

Q6. A crank and slotted lever mechanism used in a shaper has a centre distance of 300mm between the centre of oscillation of a slotted lever and the centre of rotation of crank. The radius of crank is 120mm. Find the ratio of time of cutting to the time of return stroke

Q7. What is gear and how gears are classified.

Q8. What is gear train and explain different types of gear trains with neat sketch.

Q9. What is governor and what is the difference between governor and flywheel?State different types of governors and explain the principle and working of centrifugal governor.

Q10. Derive the expression for height in case of porter governor.

Q11. A porter governor has all four arms 250mm long. The upper arms are attached on the axis of rotation and lower arms are attached to a sleeve at a distance of 30mm from the axis. The mass of the each ball is 5kg and the sleeve has a mass of 50kg. The extreme radii of rotation are 150mm and 200mm. Determine the range of speed of governor.

Q12. A proell governor has equal arms of length 300mm. The upper and lower ends of the arms are pivoted on the axis of governor. The extension arms of the lower links are each 80mm long and parallel to the axis when the radii of rotation of balls are 150mm and 200mm. The mass of each ball is 10kg and the mass of central load is 100kg. Determine the range of speed of governor.

Q13. In an epicyclic gear train, the internal wheel A and B and compound wheel C and D rotate independently about axis O. The wheels E and F rotate on pins fixed to the arm G. E gears with A and C and F gears with B and D. All the wheels have same module and the no of teeth on gears C,D,E and F are 28, 26,18 and 18.

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a) Sketch the arrangement b) Fing the no of teeth on gear A and B

c) If arm G makes 100rpm in clockwise and A is fixed fing speed of gear B.