(*a*) are non-parallel and non-intersecting, and the teeth are curved
(*b*) are non-parallel and non-intersecting, and the teeth are straight
(*c*) intersect, and the teeth are curved and oblique
(*d*) intersect, and the teeth are curved and can be ground
(*e*) none of the above.

13.375. The pressure angle in involute profile gear
(*a*) remains constant
(*b*) often changes
(*c*) rarely changes
(*d*) unpredictable
(*e*) none of the above.

13.376. In skew bevel gears, the axes
(*a*) are non-parallel and non-intersecting, and the teeth are curved
(*b*) are non-parallel and non-intersecting, and the teeth are straight
(*c*) intersect, and the teeth are curved and oblique
(*d*) intersect, and the teeth are curved and can be ground
(*e*) none of the above.

13.377. Pick up the incorrect statement
(*a*) helical gears are used to connect shafts whose axes are inclined by spiral angle of teeth
(*b*) in skew gears, the shaft axes are not parallel but they lie in parallel planes
(*c*) bevel gears are used to connect shafts which intersect in a common plane at any angle
(*d*) spur gears connect parallel shafts
(*e*) worm gears are used to connect shafts which are neither parallel nor intersecting.

13.378. In helical gears, the right hand helix will mesh
(*a*) right hand helix (*b*) left hand helix
(*c*) both of the above
(*d*) any one of the above
(*e*) none of the above.

13.379. In spiral bevel gears, the axes
(*a*) are non-parallel and non-intersecting, and the teeth are curved
(*b*) are non-parallel and non-intersecting, and the teeth are straight
(*c*) intersect, and the teeth are curved and oblique
(*d*) intersect, and the teeth are curved and can be ground
(*e*) none of the above.

13.380. If the number of teeth on two bevel gears in mesh is 30 and 60, then the cone pitch angle of the pinion will be
(*a*) $\tan^{-1} 2$ (*b*) $\tan^{-1} 0.5$
(*c*) $\sin^{-1} 0.5$ (*d*) $\sin^{-1} 2.0$
(*e*) none of the above.

13.381. In Prob. 13.380, the cone pitch angle of gear will be
(*a*) $\tan^{-1} 0.5$ (*b*) $\tan^{-1} 2.0$
(*c*) $\pi/2 - \tan^{-1} 0.5$
(*d*) $\pi/2 - \tan^{-1} 2.0$
(*e*) $\pi/2 - \sin^{-1} 0.5$.

13.382. Pitch lead angle in worm gears is the angle between the
(*a*) tangent to the pitch helix and the plane of rotation
(*b*) tangent to the pitch helix and an element of the pitch cylinder
(*c*) half the angle between two inclined faces in axial plane
(*d*) all of the above
(*e*) none of the above.

13.383. Pressure angle in worm gears is the angle between
(*a*) tangent to the pitch helix and the plane of rotation
(*b*) tangent to the pitch helix and an element of the pitch cylinder
(*c*) half the angle between two inclined faces in axial plane
(*d*) all of the above
(*e*) none of the above.

13.384. To keep noise minimum, following type of gear should be used
(*a*) involute spur (*b*) cycloidal spur
(*c*) mitter (*d*) helical
(*e*) bevel.

13.385. Helix angle in the worm gears is the angle between the
(*a*) tangent to the pitch helix and the plane of rotation
(*b*) tangent to the pitch helix and an element of the pitch cylinder

(*c*) half the angle between two inclined faces in axial plane
(*d*) all of the above
(*e*) none of the above.

13.386. The type of tooth profile used for gears in watches and clocks is
(*a*) involute (*b*) cycloidal
(*c*) hypocycloid (*d*) epicycloid
(*e*) any one of the above.

13.387. Gears used in machine tools must have the contact ratio of
(*a*) equal to 1 (*b*) less than 1
(*c*) equal to 1.4 (*d*) less than 1.4
(*e*) more than 1.4.

13.388. The backlash required for spur gears depends on
(*a*) module
(*b*) pitch line velocity
(*c*) both module and pitch line velocity
(*d*) tooth profile
(*e*) none of the above.

13.389. The limiting pitch line velocity of commercially cut gears is about
(*a*) 1 m/sec (*b*) 5 m/sec
(*c*) 10 m/sec (*d*) 20 m/sec
(*e*) 30 m/sec.

13.390. The maximum pitch line velocity for hardened steel, ground and lapped precision gears is
(*a*) 1 m/sec (*b*) 5 m/sec
(*c*) 10 m/sec (*d*) 20 m/sec
(*e*) 30 m/sec.

13.391. For accurately cut gears operating at velocities upto 20 m/sec, the velocity factor is equal to
(*a*) $\frac{3}{3+v}$ (*b*) $\frac{6}{6+v}$
(*c*) $\frac{9}{9+v}$ (*d*) $\frac{0.75}{1+v}+0.25$
(*e*) none of the above.
where v = pitch line velocity in m/sec.

13.392. If both pinion and gear are made of the same material, then the load transmitting capacity is decided by
(*a*) gear (*b*) pinion
(*c*) any one of the two
(*d*) both should be considered independently for tooth strength
(*e*) there are many other considerations.

13.393. Best profile of gear to withstand resistance to wear is
(*a*) $14\frac{1}{2}°$ full depth involute tooth
(*b*) 20° involute stub tooth
(*c*) 20° full depth involute tooth
(*d*) $14\frac{1}{2}°$ stub tooth
(*e*) none of the above.

13.394. Zero axial thrust is experienced in
(*a*) helical gears (*b*) bevel gears
(*c*) spiral gears (*d*) worm gears
(*e*) herringbone gears.

13.395. Surface endurance limit of gear material is dependent on its
(*a*) coefficient of elasticity
(*b*) elastic strength
(*c*) brinell hardness number
(*d*) yield strength
(*e*) toughness.

13.396. To avoid interference in internal gears, the internal gear as compared to pinion with $14\frac{1}{2}°$ full height teeth should have at least
(*a*) 7 teeth more
(*b*) 12 teeth more
(*c*) 20 teeth more
(*d*) 28 teeth more
(*e*) none of the above.

13.397. The initial contact in helical gears is
(*a*) point
(*b*) line
(*c*) surface
(*d*) unpredictable
(*e*) none of the above.

13.398. In order to realise the advantages of fluid friction, it is necessary to have
(*a*) parallel oil film in bearing
(*b*) converging oil film
(*c*) diverging oil film
(*d*) no oil film
(*e*) any type of oil film.

13.399. Pivoted segment thrust bearing is used in order to provide
(*a*) uniform distribution of load
(*b*) uniform wear
(*c*) a converging film of oil
(*d*) easy flow of oil
(*e*) none of the above.

13.400. A shaft rotating in anticlockwise direction at slow speed inside a bearing will be
(*a*) at bottom most of bearing
(*b*) towards left side of bearing and making metal to metal contact
(*c*) towards left side of bearing and making no metal to metal contact
(*d*) towards right side of bearing and making metal to metal contact
(*e*) towards right side of bearing and making no metal to metal contact.

13.401. A shaft rotating in anticlockwise direction at high speed inside a bearing will be
(*a*) at bottom most of bearing
(*b*) towards left side of bearing and making metal to metal contact
(*c*) towards left side of bearing and making no metal to metal contact
(*d*) towards right side of bearing and making metal to metal contact
(*e*) towards right side of bearing and making no metal to metal contact.

13.402. Bearing characteristic number relating Z-absolute viscosity of lubricant, N-speed of journal and p-bearing pressure on projected bearing area is
(*a*) $\frac{ZN}{p}$ (*b*) $\frac{p}{NZ}$
(*c*) $\frac{Z}{pN}$ (*d*) $\frac{N}{pZ}$
(*e*) $\frac{pN}{Z}$.

13.403. Which of the following is antifriction bearing
(*a*) pedestal bearing
(*b*) collar bearing
(*c*) full journal bearing
(*d*) hydrostatic bearing
(*e*) needle bearing.

13.404. Anti-friction bearings are
(*a*) sleeve bearings
(*b*) gas lubricated bearings
(*c*) ball and roller bearings
(*d*) special bearings requiring no lubricant
(*e*) plastic bearings.

13.405. Which of the following is called the divided journal bearings
(*a*) ball and roller bearings
(*b*) pivot bearing
(*c*) split carbon bearings
(*d*) plummer block
(*e*) collar bearing.

13.406. Which of the following parameters should be monitored for determining safe operation of journal bearing
(*a*) oil pressure
(*b*) bearing metal temperature
(*c*) drain oil temperature
(*d*) bearing vibration
(*e*) all of the above.

13.407. In case of ball bearings, which part is made harder than others
(*a*) ball
(*b*) outer race
(*c*) inner race
(*d*) all are made equally hard
(*e*) cage is made hardest.

13.408. Railroad car bearing is a
(*a*) ball bearing
(*b*) roller bearing
(*c*) needle bearing
(*d*) full journal bearing
(*e*) partial journal bearing.

13.409. In the case of two cylinder locomotive engines, the cranks are located at the following angle to each other
(*a*) 0° (*b*) 90°
(*c*) 180° (*d*) 270°
(*e*) none of the above.

13.410. In the case of coupled locomotives, the coupling rods w.r.t. the adjacent driving cranks are located at the following angle
(*a*) 0° (*b*) 45°
(*c*) 90° (*d*) 135°
(*e*) 180°.

13.411. A suspended body is to be struck heavily without producing any reaction at the support. It should be done at
(*a*) centre of gravity
(*b*) centre of suspension
(*c*) centre of spin
(*d*) centre of percussion
(*e*) it is not possible.

13.412. The period corresponding to no movement of cam follower for cam rotation is known as
(*a*) stationary (*b*) fixed

(*c*) constant (*d*) dwell
(*e*) neither rising nor falling.

13.413. The following type of cam follower is generally used in automobiles
(*a*) mushroom type
(*b*) roller type
(*c*) flat type
(*d*) spherical type
(*e*) knife-edge type.

13.414. In order to minimise jerks, the following type of cam is used
(*a*) cycloidal (*b*) involute
(*c*) S.H.M. (*d*) parabolic
(*e*) elliptical.

13.415. Which of the following parameters is irrelevant in determining cam size
(*a*) base circle diameter
(*b*) pitch circle diameter
(*c*) pressure angle
(*d*) throw of cam
(*e*) displacement curve.

13.416. Pitch point is the point on the cam pitch curve having the
(*a*) zero pressure angle
(*b*) minimum pressure angle
(*c*) maximum pressure angle
(*d*) there is no such criterion
(*e*) none of the above.

13.417. The smallest circle drawn to the pitch curve from the centre of rotation of the cam is known as
(*a*) pitch circle
(*b*) prime circle
(*c*) base circle
(*d*) hypothetical circle
(*e*) working circle.

13.418. Following type of cam is used for high speed engine
(*a*) involute (*b*) cycloidal
(*c*) harmonic (*d*) flat
(*e*) uniform acceleration.

13.419. Following type of cam is used for low and moderate speed engine
(*a*) involute (*b*) cycloidal
(*c*) harmonic (*d*) flat
(*e*) uniform acceleration.