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Question Paper Code: 93A04

B.E. / B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Agriculture Engineering

19UAG304 – FUNDAMENTALS OF THEORY OF MACHINES

(Regulation 2019)

Duration: One hour

Maximum: 30Marks

PART A - (6 x 1 = 6 Marks)

(Answer any six of the following questions)

1. A railway bridge is an example of a CO1- R
(a) Machine (b) Structure (c) Kinematic chain (d) None of these
2. In a kinematic chain, a quaternary joint is equivalent to CO1- R
(a) one binary joint (b) two binary joints
(c) three binary joints (d) four binary joints
3. The unit of linear acceleration is CO1- R
(a) kg-m (b) m/s (c) m/s^2 (d) rad/s^2
4. The Radial acceleration of the link AB is _____ to the link AB CO1- R
(a) Parallel (b) Perpendicular (c) Tangent (d) None of the above
5. Mitre gears are used for CO1- R
(a) great speed reduction (b) equal speed
(c) minimum axial thrust (d) minimum backlash
6. The train value of a gear train is CO1- R
(a) equal to velocity ratio (b) reciprocal of velocity ratio
(c) equal to unity (d) none of these
7. Cam size depends upon CO1- R
(a) base circle (b) pitch circle (c) prime circle (d) outer circle
8. The cam follower generally used in automobile engines is CO1- R
(a) knife edge follower (b) flat faced follower
(c) spherical faced follower (d) roller follower

9. The coefficient of fluctuation of speed is _____ of maximum fluctuation of speed and the mean speed. CO1- R
- (a) sum (b) difference (c) product. (d) ratio
10. When the speed of the engine fluctuates continuously above and below the mean speed, the governor is said to be CO1- R
- (a) Mean speed (b) Fluctuation of speed
(c) Inertia force (d) None of these

PART – B (3 x 8= 24 Marks)

(Answer any three of the following questions)

11. Describe any two inversions of Single slider crank mechanism with sketches CO1- U (8)
12. In a four bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. CO2- App (8)
13. Two involute gears of 20° pressure angle are in mesh. A pinion having 40 teeth drives a gear having 80 teeth. 12 mm module and 10 mm addendum. Find the arc of contact. CO3- App (8)
14. A cam drives a knife edge follower in the following manner During first 120° rotation of the cam, follower moves outwards through a distance of 40 mm with simple harmonic motion. The follower dwells during next 30° of cam rotation. During next 120° of cam rotation, the follower moves inwards with uniform velocity. The follower dwells for the next 90° of cam rotation. The minimum radius of the cam is 50 mm. Draw the profile of the cam. CO4- App (8)
15. In an engine governor of the Porter type, the upper and lower arms are 200 mm and 250 mm respectively and pivoted on the axis of rotation. The mass of the central load is 15 kg, the mass of each ball is 2 kg. If the limiting inclinations of the upper arms to the vertical are 30° and 40°, calculate the minimum and maximum speeds of the governor. CO5- App (8)