A **Reg. No. :** | | | | | | | | | | | | |

Question Paper Code: U4A04

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

Fourth semester

Agriculture Engineering

21UAG404-FUNDAMENTALS OF THEORY OF MACHINES

(Regulations 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Scotch yoke mechanism is the inversion of CO1- U

   (a) Single slider kinematic chain (b) Double slider kinematic chain

   (c) Four bar chain (d) None of the above

2. A kinematic chain is known as a mechanism when CO1- U

   (a) one link is fixed (b) two of the link is fixed

   (c) three link is fixed (d) none of the link is fixed

3. Which formula is used to calculate angle of static friction (Φs)? CO1- U

   (a) tan-1 μs (b) sin-1 μs (c) cos-1 μs (d) none of the above

4. Which belt is used to transmit power at high speeds? CO1- U

   (a) Flat belt (b) V belt (c) Both a. and b. (d) None of the above

5. The size of a cam depends upon CO1 -U

   (a) base circle (b) pitch circle (c) prime circle (d) prime curve

6. The cam follower generally used in automobile engines is CO1 -U

   (a) knife edge follower (b) flat faced follower

   (c) spherical faced follower (d) roller follower

7. The size of a gear is usually specified as CO1 -U

   (a) pressure angle (b) circular pitch (c) diametral pitch (d) pitch circle diameter

8. The module of gear be m, the number of teeth T and pitch circle diameter D then CO1- U

(a) m=D/T (b)D= T/m (c) m= D/2T (d) none of the above

9. When the sleeve of a porter governor moves upward, the governor speed CO1 -U

(a) increases (b) decreases (c) remains unaffected (d) moderate

10. The force which balancing of centrifugal force on the rotating balls by an equal and opposite radial is called CO1- U

(a) Controlling force (b) Balancing force (c) Gravitational force (d) All of the above

PART – B (5 x 2= 10Marks)

11. Define degrees of freedom. CO1- U

12. State the angle of repose. CO1- U

13. Define dwell period. CO1 -U

14. Where the epicyclic gear trains are used? CO1 -U

15. Differentiate the functions of flywheel and governors. CO1- U

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail and give the examples of types of constrained motion. CO1- U (16)

Or

(b) Describe Whitworth's quick return mechanism with neat sketch. CO1- U (16)

17. (a) Briefly explain the following: 1) Slip of the belt 2) Creep of the belt. CO1- U (16)

Or

(b) Explain in detail about the sliding and rolling friction. CO1- U (16)

18. (a) A cam is designed for a knife follower with the following data. (i) Cam lift = 40 mm during 90° of cam rotation with SHM (ii) Dwell for the next 30° (iii) During the next 60° of cam rotation, the follower returns to original position with SHM. (iv) Dwell for the reaming 180° Draw the profile of the cam when the line of stoke is offset 20 mm from the axis of the cam shaft CO1- U (16)

Or

(b) Construct a tangent cam and mention the important terminologies on it CO1 -U (16)

19.	(a)	State and prove the law of gearing and thus derive the expression for "Velocity of sliding".	CO1- U	(16)
		Or		
	(b)	Explain the terminology involved in Gears in detail.	CO1- U	(16)
20.	(a)	Draw and give the explanation of centrifugal governor with neat sketches	CO1- U	(16)
		Or		
	(b)	With the neat sketches explain the Porter Governor.	CO1- U	(16)