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

Question Paper Code: 56A03

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

Sixth semester

Agriculture Engineering

15UAG603 – DESIGN OF AGRICULTURAL MACHINERY

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. A load which is suddenly applied with a velocity is known as CO1- R

   (a) Static load (b) Dynamic load (c) Fluctuating load (d) Impact load

2. The property of a material which enables it to undergo change in space and size without rupture under the external load is CO1- R

   (a) Malleability (b) Stiffness (c) Ductility (d) Stiffness

3. The cross section of V belt is CO2- R

   (a) Triangle (b) Circular (c) Trapezoidal (d) Rectangular

4. Which of the following rope will be most flexible CO2- R

   (a) 6 x 7 (b) 6 x 19 (c) 6 x 37 (d) 8 x 19

5. The_____ are provided half in the keyway of the shaft and half in the keyway of the hub or boss of the rotating element. CO3- R

   (a) Sunk key (b) Rectangular Key (c) Gib-head Key (d) Parallel Key

6. How splines are designated CO3- R

   (a) N x t x T (b) N x t x D (c) N x t x d (d) N x d x D

7. _____springs are used where high stiffness is required. CO4- R

(a) Belleville Spring (b) Helical Spring (c) Leaf Spring (d) Spiral Spring

8. _____spring is capable of taking lateral loads, braking torque and driving torque in addition to torque. CO4- R

(a) Disc Spring (b) Leaf Spring (c)Spiral Spring (d) Helical Spring

9. Bevel gears having shaft angle 90 degree are known as CO5- R

(a) Zero bevel gear (b) Crown gear (c) Spiral bevel gear (d) Spiral bevel gear

10. _____ also known as needle roller bearing, is the roller bearing having rollers of small diameter as compared to length. CO5- R

(a) Ball bearing (b) Cylindrical roller bearing

(c) Quill bearing (d) Taper Roller bearing

PART – B (5 x 2= 10 Marks)

11. State the factors influencing the selection of material for a machine design CO1 R

12. Specify the kinds of rope. CO2 R

13. List the essential parts of knuckle joint CO3 R

14. Differentiate between closed and open coiled helical spring CO4 R

15. Define Gear ratio CO5 R

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail FACTOR OF SAFETY? CO1- U (16)

Or

(b) Discuss in detail weighted point method commonly used for material selection. CO1- U (16)

17. (a) Select a wire-rope for a vertical mine hoist to lift a load of 20KN from a depth of 500 meters. A rope speed of 3m/s is to be attained in 10seconds. CO2- App (16)

Or

	(b)	Select a flat belt to drive a mill at 250rpm from a 10Kw,730rpm motor. Centre distance is to be around 2m. The mill shaft pulley is of 1m diameter	CO2- App	(16)
18.	(a)	Discuss in detail about the design of cotter joint	CO3- Ana	(16)
		Or		
	(b)	A shaft is used for transmitting 50 kW power at 1200 rpm. It is subjected to a maximum bending moment of 275N-m. The shaft is not to twist more than 2degree in a length of 2m. The allowable shear stress for the shaft is 60N/mm^2. If the modules of rigidity is 80 x 103N/mm^2.Design a shaft.	CO3- Ana	(16)
19.	(a)	Design a helical compression spring, made of oil hardened and tempered plain carbon steel for a maximum static load 1000N and a maximum deflection of 25mm using the value of spring index as 5. The permissible shear stress and modulus of rigidity for spring are 420N/mm^2 and 84kN/mm^2 respectively.	CO4- U	(16)
		Or		
	(b)	A truck spring has 12 number of leaves, two of which are full length leaves. The spring supports are 1.05m apart and the central band is 85mm vide. The ratio of total depth to the width of the spring is 3. The central load is 5.4kN. if the permissible stress is 280MPa. Determine (i) The thicknedd and the width of the steel spring leaves and (ii) The deflection of the spring.	CO4- U	(16)
20.	(a)	Design a pair of spur gears to transmit 20kW at a pinion speed of 1400rpm. The transmission ratio is 4 . Assume suitable materials and stresses.	CO5- U	(16)
		Or		
	(b)	Design a helical gear drive to transmit the power of 5kW at a pinion speed of 1440 rpm. The wheel speed is 400 rpm. Choose proper materials.	CO5- U	(16)