

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/  
COMMERCIAL PRACTICE, NOVEMBER - 2023  
DESIGN OF MACHINE ELEMENTS**

[Maximum Marks : 75]

[Time : 3 hours]

**PART-A**

**I. Answer all the following questions in one word or sentence. Each question carries 1 mark.**

**(9x1=9 marks)**

		Module Outcome	Cognitive level
1	Each part of a machine, which moves relative to some other part is known as .....	M1.02	R
2	When the motion between a pair is limited to a definite direction irrespective of the direction of force applied, then the motion is said to be .....	M1.02	R
3	A riveted joint that in which one plate overlaps the other and the two plates are then riveted together is known as .....	M1.04	R
4	The stresses developed on shafts due to the forces acting upon machine elements like gears, pulleys etc. as well as due to the weight of the shaft itself is .....	M2.02	R
5	The stresses developed in shafts due to the transmission of torque is .....	M2.02	R
6	The keys which are provided half in the keyway of the shaft and half in the keyway of the hub or boss of the pulley is .....	M2.03	R
7	A taper key which fits in a keyway in the hub and is flat on the shaft is called .....	M2.03	R
8	The maximum travel of the follower from its lowest position to the topmost position is called.....	M3.01	R
9	The belt drive, which is used with shafts arranged parallel and rotating in the same direction is .....	M4.04	R

**PART B**

**II. Answer any Eight questions from the following. Each question carries 3 marks.**

**(8x3=24)**

		Module Outcome	Cognitive level
1	Define the following: (i) Ultimate Stress (ii) Yield Stress (iii) Factor of Safety	M1.01	R
2	List any three desirable properties of a good shaft material.	M2.01	R
3	What are the different stresses developed in shafts?	M2.02	R
4	What are the different types of keys used as temporary fastener?	M2.03	R
5	List any three types of Centrifugal Governors.	M3.02	R
6	What you mean by Coefficient of Fluctuation of Speed of a Governor?	M3.03	R

7	Write any three requirements of good shaft couplings.	M3.05	R
8	Write any three functions of Shaft couplings.	M3.05	R
9	List any three properties of Sliding Contact Bearing Materials.	M3.06	R
10	What are the advantages of Gear drive over other power transmission elements?	M4.04	R

### PART C

Answer **all** questions from the following. Each question carries 7 marks.

**(6x7=42marks)**

		Module Outcome	Cognitive level
III	According to the type of relative motion between the elements, what are the different types of Kinematic pairs? <b>OR</b>	M 1.02	U
IV	With neat sketches, explain different types of Kinematic chains.	M1.02	U
V	Explain the inversions of Four bar chain Mechanism. <b>OR</b>	M1.02	U
VI	With neat sketches, explain different types of Riveted joints.	M1.04	U
VII	A steel spindle transmits 4 KW at 800 r.p.m. The angular deflection should not exceed $0.25^\circ$ per metre of the spindle. If the modulus of rigidity for the material of the spindle is 84 GPa, Find the diameter of the spindle. <b>OR</b>	M2.02	A
VIII	With neat sketches, explain different types of Sunk Keys.	M2.03	U
IX	Explain the difference between the working of a Flywheel and Governor. <b>OR</b>	M3.04	U
X	Explain different types of Shaft couplings.	M3.05	U
XI	With neat sketches, explain different types of Belts. <b>OR</b>	M4.02	U
XII	Two pulleys, one 450 mm diameter and the other 200 mm diameter, on parallel shafts 1.95 m apart are connected by a crossed belt. Find the required length of the belt.	M4.02	A
XIII	Explain the different types of Gears according to the position of the axes of shafts. <b>OR</b>	M4.04	U
XIV	In a simple train of gears, A has 30 teeth, B has 40 teeth, C has 60 teeth and D has 40 teeth. If A makes 36 rpm, find the rpm of the gear C and D.	M4.04	A

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