

**DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE, APRIL - 2025**

DESIGN OF MACHINE ELEMENTS

[Maximum marks: 75]

[Time: 3 Hours]

PART A

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

(9 x 1 = 9 Marks)

		Module outcome	Cognitive level
1	A screw is specified by its.....	M1.01	U
2	The diameter of the rivet hole is usually.....the nominal diameter of the rivet.	M1.04	U
3	A feather key is generally.....in shaft and.....in hub.	M2.03	R
4	The crank shaft is.....(machine/transmission)shaft.	M2.02	R
5	When the sleeve of a Porter governor moves upwards, the governor speed.....	M3.02	U
6	The universal coupling is a type of.....coupling.	M3.05	R
7	In a turning moment diagram, the variation of energy above and below the mean resisting torque line is called.....	M3.04	R
8	The V-belts are particularly suitable for.....drives.	M4.01	R
9	The contact ratio for gears is.....	M4.04	R

PART B

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

(8 x 3 = 24 Marks)

		Module outcome	Cognitive level
1	Differentiate between lower pair and higher pairs.	M1.02	U
2	Enumerate the different types of riveted joints.	M1.04	R
3	Explain different types of materials used for shaft.	M2.01	U
4	List various types of shafts used.	M2.02	R
5	Distinguish between sunk key and saddle key.	M2.03	R
6	Differentiate between disc cam and cylindrical cam.	M3.01	R
7	Describe the function of flywheel in an IC engine.	M3.04	R
8	Differentiate between thrust bearing and journal bearing.	M3.06	U

9	Differentiate between simplex, duplex and triplex chains.	M4.03	U
10	Differentiate between simple gear train and compound gear train.	M4.04	U

PART C

Answer all questions. Each question carries seven marks

(6 x 7 = 42 Marks)

		Module outcome	Cognitive level
III	Classify the kinematic pairs in detail.	M1.02	R
	OR		
IV	Explain different types of riveted joints with neat sketch.	M1.04	U
V	List at least five advantages and disadvantages of welded joints over riveted joints.	M1.03	R
	OR		
VI	With neat sketch explain the working of Whitworth quick return motion mechanism.	M1.02	U
VII	A mild steel shaft transmits 23kW at 200 rpm. It carries a central load of 900 N and is simply supported between the bearings 2.5 meters apart. Determine the size of the shaft, if the allowable shear stress is 42 MPa and the maximum tensile or compressive stress is not to exceed 56 MPa.	M2.02	U
	OR		
VIII	A motor shaft of 50 mm diameter transmits a torque of 150 Nm. It has an extension of 75 mm. The permissible shear and crushing stresses for MS key are 55 MPa and 110 MPa. Determine the sizes of the key in motor shaft extension.	M2.03	U
IX	A cam is to give the following motion to a knife-edged follower (1) To raise the follower through 30 mm with uniform acceleration and deceleration during 120° rotation of cam. (2) Dwell for the next 30° of cam rotation. (3) To lower the follower with simple harmonic motion during the next 90° rotation of the cam. (4) Dwell for the rest of the cam rotation. The cam has minimum radius of 30 mm and rotates counter-clockwise at a uniform speed of 800 rpm. Draw the profile of the cam if the line of stroke of follower passes through the axis of the cam shaft.	M3.02	A

	OR		
X	Explain any two types of shaft couplings, with the help of neat sketches mentioning the uses of each type.	M3.05	U
XI	Two pulleys 450 mm and 200 mm diameter are on parallel shafts 2 m apart and are connected by a crossed belt. Find the length of belt required and the angle of contact between the belt and each pulley.	M4.02	A
	OR		
XII	Two parallel shafts, about 60 cm apart, are to be connected by spur wheels. One shaft is to run at 120 rpm and other at 360 rpm. Design the wheels, if the diametrical pitch of the teeth is to be 0.25 mm	M4.04	A
XIII	List and explain with help of neat sketch the various types of gear trains used.	M4.04	U
	OR		
XIV	Explain the function of differential in an automobile.	M4.04	U
