

Unit-V

S.No	Questions	BT	CO	
Part – A (Short Answer Questions)				
1	Write short notes on flexible couplings.	L1	CO5	
2	What are flexible couplings and what are their applications?	L2	CO5	
3	What is the effect of keyway cut into the shaft?	L1	CO5	
4	Write short notes on muff coupling	L2	CO5	
5	With suitable example state when flexible coupling is preferred over the rigid coupling.	L2	CO5	
6	What is the importance of muff couplings?	L1	CO5	
7	Write a short note on universal coupling?	L1	CO5	
8	Discuss the effect of keys and key ways on the strength of the shaft.	L2	CO5	
9	What is a coupling? Classify shaft couplings?	L2	CO5	
10	What are the requirements of a good Coupling?	L2	CO5	
Part – B (Long Answer Questions)				
11	a)	Explain briefly a design of shafts subjected to combined bending and torsion.	L2	CO5
	b)	A shaft supported at the ends in ball bearing carries a straight tooth spur gear at its mid span and is to transmit 7.5kW at 300 r.p.m. The pitch circle diameter of the gear is 150 mm. The distance between the center line of bearings and gear are 100 mm each. If the shaft is made of steel and the allowable shear stress is 45 MPa, determine the diameter of the shaft. Show in sketch how the gear will be mounted on the shaft; also indicate the ends where the bearings will be mounted? The pressure angle of the gear may be taken as 20°.	L3	CO5
12	a)	How does the working of a clamp coupling differ from that of muff coupling?	L2	CO5
	b)	Design a shaft to transmit power from an electric motor to a lathe head stock through a pulley by means of a belt drive. The pulley weighs 200N and is located at 300mm from the centre of the bearing. The diameter of the pulley is 200mm and the maximum power transmitted is 1KW at 120rpm. The angle of lap of the belt is 180° and coefficient of friction between the belt and the pulley is 0.3. The shock and fatigue factors for bending and twisting are 1.5 and 2.0 respectively. The allowable shear stress in the shaft may be taken as 35MPa.	L3	CO5
13		Design a cast iron protective type flange coupling to connect two shafts in order to transmit 7.5kW at 720rpm. The following permissible stresses may be used:	L3	CO5
		Permissible shear stress for shaft, bolt and key material = 33MPa Permissible crushing stress for shaft, bolt and key material = 60MPa Permissible shear stress for the cast iron = 15MPa.		
14	a)	Explain the design procedure for flexible coupling	L2	CO5
	b)	Design a Cast Iron flange coupling for a steel shaft transmitting 15 KW at 200 rpm and having an allowable shear stress of 40 MPa. The working stress in the bolts should not exceed 30 MPa. Assume that the same material is used for shaft and key and that the crushing stress is twice the value of its shear stress. The maximum torque is 25 % greater than the full load torque. The shear stress for a Cast Iron is 14 MPa.	L3	CO5
15	a)	Explain about the design of Bushed pin flexible coupling with a neat sketch	L2	CO5
	b)	Design a Cast Iron flange coupling for a mild steel shaft transmitting 90 KW at 250 rpm. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed 10 in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.	L3	CO5
16	a)	Explain the design procedure for Muff Coupling.	L2	CO5
	b)	Design a Cast Iron flange coupling for a mild steel shaft transmitting 100 KW at 300 rpm. The allowable shear stress in the shaft is 40 MPa and the angle of twist is not to exceed 10 in a length of 20 diameters. The allowable shear stress in the coupling bolts is 30 MPa.	L3	CO5