ALPHA COLLEGE OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF MECHANICAL ENGINEERING
MACHINE DESIGN (2171909)
BE: -7th SEM CLASS: - ME A & B

FREQUENTLY ASKED QUESTIONS IN GTU EXAMS

Assignment No. 1 (SPUR GEARS AND PARALLEL AXIS HELICAL GEARS)

Sr. No.	Questions	Year	Marks
1	Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures.	Summer 2013 Summer 2014	05
2	Design a spur gear pair from the following given data. Power to be transmitted = 22.5 kW, Pinion speed = 1450 rpm, Speed reduction = 2.5, No. of teeth on pinion = 20, Service factor = 1.5, b= 10m, Pitch line velocity = 5 m/sec (For initial calculation of module), Maximum permissible error in gear tooth profile = 0.025 mm, k = A factor depending upon the form of teeth = 0.111,Velocity factor = 3/ (3 + V), where V is the pitch line velocity in m/s. Take endurance surface hardness = 600 MPa Lewis form factor = 0.154 – 0.912/No. of teeth for 20o pressure angle involutes tooth system. The materials and stresses are as under:	Summer 2013 Summer 2014 May 2012	07
3	Explain different modes of gear teeth failures, stating their reasons and remedies	Summer 2013 Winter 2013 Winter 2014	05
4	A helical gear speed reducer is to be designed. The rated power of the speed reducer is 75 kw at a pinion speed of 1200 rpm. The speed ratio is 3:1 for medium shock condition and 24 hr operation. Determine module, face width, no. of teeth in each Gear. Specify material & heat treatment. The teeth are 20o full depth in the normal plane.	Winter 2013 Winter 2014	07
5	A spur gear having 22 teeth to be made of plain carbon steel 40C8 (S_{ut}=580N/mm^2) is to be mesh with a gear having 88 teeth to be made of grey cast iron FG260 (S_{ut}=260N/mm^2).The pinion shaft is connected to 12KW, 1440 rpm electric motor. The starting torque of the motor is approximately twice the rated torque. The tooth system is 20° full depth involutes. The face width is 10 times module for which the load distribution factor is 1.4. The gears are to be machined to meet the specifications of grade 7 for which deformation factor is 240 N/mm. (I) If factor of safety require against bending failure 1.0 , design the gear pair by using velocity factor Velocity factor = and Buckingham's equation for dynamic load. (ii) if the factor of safety required against pitting failure is 1.5 , specify surface hardness. Y= 0.484 - 2.87/Z	May 2012 Summer 2014	10

Material	[σ_b]	Elasticity Modulus	Hardness
Pinion (Fe 410)	135 N/mm^2	2.1 x 10^5 N/mm^2	260 BHN
Gear (FG 200)	65 N/mm^2	1.1 x 10^5 N/mm^2	250 BHN

	Buckingham's equation $F_d = Ft + \frac{(21v(bc+ftmax)}{21v+(bc+Ftmax)^{0.5}}$ $K= 0.18(BHN/100)^2$ for steel pinion and cast iron Standard module are 4,5,6,8,10,12,16 , Service factor =2, Load concentration factor=1.4		
6	Explain standard system of gear tooth and advantage and disadvantages of 14.5°and 20° involutes system.	Winter 2013	04
7	Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures.	Summer 2013	04
8	A pair of parallel helical gears consists of a 20 teeth pinion meshing with a 100 teeth gear. The pinion rotates at 720 rpm. The normal pressure angle is 20°, while the helix angle 25°. The face width is 40 mm and the normal module is 40 mm. The pinion as well as the gear are made of steel 40C8 having ultimate tensile strength of 600 N/mm2 and heat treated to a surface hardness of 300 BHN. The service factor and the factor of safety are 1.5 and 2 respectively. Assume that the velocity factor accounts for the dynamic load and calculate the power transmitting capacity of gears.	Summer 2013	10
9	Differentiate between involute and cycloidal profile of the gears.	Summer 2014	04
10	A pair of helical gears having a transmission ratio 8:3 , with a steady load condition , used for turbine. The maximum speed is 2400 r.p.m. The pinion is to have 27 teeth and a face width of 100 mm. The circular module is 6 mm. The material used for gears is heat treated steel with 250 BHN and have static stress of 210 MPa. The gears are carefully cut. Calculate value of dynamic load and wear load.	Summer 2012	07
11	Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures.	Winter 2014	05
12	A pair of parallel helical gears consists of 24 teeth pinion rotating at 5000 rpm and supplying 12 kW power to a gear. The speed reduction is 4:1. The normal pressure angle and helix angle are 20° and 23° respectively. Both gears are made of hardened steel (S_{ut} = 600 N/mm^2). The service factor and factor of safety are 1.5 and 3 respectively. Calculate 1. Module and face width of gears. 2. Surface hardness for the gears assuming a factor of safety of 1.5 for wear consideration.	Winter 2013	14
13	A pair of mating carefully cut spur gears has 20° full depth of 4 mm module. The number of teeth on pinion and gears are 38 and 115, respectively. The face width is 40 mm. If the pinion and gear are made of steel with $f_{b\ Static}$ = 233 MPa and surface hardness of 300 BHN. Calculate the safe power that can be transmitted when the pinion is run at 1200 rpm.	Winter 2013	14
14	Explain different modes of gear teeth failures, stating their reasons and remedies.	Winter 2014	04
15	What are the advantages of helical gears over spur gears?	Winter 2014	04
16	Design a pair of helical gears to transmit 50 kW at a speed of 1440 rpm to a shaft required to run at 480 rpm. The helix angle is approximately 25° and 20° full depth teeth are used. Both the gear and pinion are made of steel with permissible stress 80 N/mm^2 and 100 N/mm^2 respectively. Take minimum number of teeth on pinion 16. Check your design for dynamic load and determine minimum hardness of teeth required.	Winter 2014	10
17	Discuss causes & remedies of gear tooth failure.	May 2012	04
18	A helical gear speed reducer is to be designed. The rated power of the speed reducer is 75 kw at a pinion speed of 1200 rpm. The speed ratio is 3:1 for medium shock condition and 24 hr operation. Determine module, face width, no. of teeth in each gear. Specify material & heat treatment. The teeth are 20° full depth in the normal plane.	May 2012	10

19	A pair of parallel helical gears consists of 24 teeth pinion rotating at 5000 rpm and supplying 12 kW power to a gear. The speed reduction is 4:1. The normal pressure angle and helix angle are 20° and 23° respectively. Both gears are made of hardened steel (S_{ut} = 600 N/mm^2). The service factor and factor of safety are 1.5 and 3 respectively. Calculate 1. Module and face width of gears. 2. Surface hardness for the gears assuming a factor of safety of 1.5 for wear consideration.	October 2012	14
20	A pair of mating carefully cut spur gears has 20^0 full depth of 4 mm module. The number of teeth on pinion and gears are 38 and 115, respectively. The face width is 40 mm. If the pinion and gear are made of steel with $f_{b\ Static}$ = 233 MPa and surface hardness of 300 BHN. Calculate the safe power that can be transmitted when the pinion is run at 1200 rpm.	October 2012	14

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Assignment No. 2 (BEVEL AND WORM GEARS)			
Sr. No.	Questions	Year	Marks
1	Explain the importance of thermal considerations in worm and worm gear design.	Summer 2013 May 2012	05
2	Two shafts at right to each other are connected by a bevel pair having full depth involutes teeth. The pinion having 20 teeth transmits 40 kW at 750 rpm to gear shaft running at 375 rpm. Take allowable static stress for pinion and gear materials 100 N/mm2 and 70 N/mm2 respectively. Determine module, pitch diameters and face width	May 2012 Winter 2014	07
3	Explain thermal consideration while designing worm and worm wheel drive.	May 2012	04
4	A pair of high grade cast iron bevel gears having shaft at right angle are to have an angular velocity ratio of driver to driven of 2 to3. The driver is to rotate at 175 rev/min and is to transmit 10 KW. It is 0.4 meter in pitch diameter. Take the width of face as about one third of the length of pitch element and determine the pitch of the gear. Assume 24 hr/day operation. Velocity factor $=\frac{3}{3+v}$, Levis factor = π(0.154-(0.921/no. of teeth)) Beam strength = f_{ef} m Y(1-F/L) High grade cast iron f_{ef} = 84MPa, f_{es} for cast iron =630 MPa., Ep = Eg= 105MPa	Summer 2014	10
5	Two shafts at right to each other are connected by a bevel pair having full depth involutes teeth. The pinion having 20 teeth transmits 40 kW at 750 rpm to gear shaft running at 375 rpm. Take allowable static stress for pinion and gear materials100 N/mm^2 and 70 N/mm^2 respectively. Determine module, pitch diameters and face width.	May 2012	10
6	A triple threaded worm rotating at 1200 r.p.m. drives a worm gear having 36 teeth and transmits 15 KW power. The teeth are of 20° full depth involutes profile .The axial pitch of the worm is 30 mm and pitch diameter of 60 mm. The co-efficient of friction is 0.03. Calculate 1) Helix angle of worm 2) Speed ratio 3) Centre distance between two shafts, 4) Apparent stress in the worm gear. 5) Efficiency of drive.	Summer 2013	10
7	Give advantages and drawback of worm gear.	May 2012	04
8	It is required to design a pair of bevel gears, which are mounted on shafts intersecting at right angles. The pinion receives 20 kW power through its shaft and rotates at 720 rpm. The number of teeth on pinion and gear are 30 & 45 respectively. The pressure angle is 20° full depth teeth form. The gears are made of plain carbon steel with permissible bending stress as 200 MPa. The gears are case hardened and the surface hardness is 300 BHN. Take service factor = 1.25.	Summer 2013	14
9	Explain the importance of thermal considerations in worm and worm gear design.	May 2012	04
10	It is required to design a pair of bevel gears, which are mounted on shafts intersecting at right angles. The pinion receives 20 kW power through its shaft and rotates at 720 rpm. The number of teeth on pinion and gear are 30 & 45 respectively. The pressure angle is 20° full depth teeth form. The gears	October 2012	14

	are made of plain carbon steel with permissible bending stress as 200 MPa. The gears are case hardened and the surface hardness is 300 BHN. Take service factor = 1.25.		
11	A speed reducer unit is to be designed for an input of 5 kW with a transmission ratio of 25. The speed of the hardened steel worm is 1750 rpm. The worm wheel is to be made of chilled bronze. The tooth form is to be 20°full depths involute. Assume double start worm. Design a worm and worm wheel.	October 2012	14
12	Two shafts at right to each other are connected by a bevel pair having full depth involute teeth. The pinion having 20 teeth transmits 40 kW at 750 rpm to gear shaft running at 375 rpm. Take allowable static stress for pinion and gear materials 100 N/mm^2 and 70 N/mm^2 respectively. Determine module, pitch diameters and face width.	Winter 2013	10
13	Explain the different causes of gear tooth failures and suggest possible remedies to avoid such failures	Winter 2013	04
14	Explain the gear material and heat treatment.	Winter 2014	04
15	The speed reducer unit is to be designed for an input of 2 kw at 1600 rpm. The velocity ratio is 25. The worm is to be made of hardened steel and the gear of phosphor bronze having a static stress of 70 MPa. The approximate distance between two shafts is 120 mm. Taking a velocity factor $K_v = \frac{6}{6+v}$ and tooth form factor y = 0.154 - $\frac{0.912}{Z_g}$ and a wear factor of 0.7 find i. Standard module of gear ii. Face Width of the gear & length of worm iii. Check the design for wear load.	Winter 2014	10
16	What are the advantages of spiral bevel gears over straight bevel gears?		
17	What is hypoid gear? Why is it used in automobiles?		
18	A Pair of bevel gears consists of a 30 teeth pinion meshing with a 48 teeth gear. The gears are mounted on shafts that are intersecting at right angles. The module at the large end of the tooth is 4 mm. Calculate: (i) The pitch circle diameter of the pinion and the gear (ii) The pitch angles for the pinion and gear (iii) The cone distance		
19	What are the advantages of double-enveloping worm gear drive over single-enveloping worm gear drives?		
20	A Pair of worm gears is designated as 1/52/10/8 The worm rotates at 1000 rpm and the normal pressure angle is 20°. Determine the coefficient of friction and the efficiency of the worm gears.		

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Assignment No. 3 (DESIGN OF GEAR BOXES)			
Sr. No.	Questions	Year	Marks
1	Explain the procedure of designing multi speed gear box.	Summer 2014 May 2012	07
2	Explain what is structural diagram and method of drawing structural diagram of gear box.	May 2012 Summer 2013 Winter 2014	05
3	Why it is necessary to provide multispeed drive for a machine tool? Give step by step procedure for the design of 8 speed drive for a lathe giving governing design equations.	Winter 2014 Summer 2013	04
4	Explain deign procedure for 6 speed reduction gear box.	Winter 2014	07
5	Design a suitable speed gear box for a head stock of a lathe that has a variation of speed from 105 r.p.m. to 690 r.p.m. in 9 steps. The power is supplied by an electric motor of 10 KW capacity running at 1000 r.p.m. and having driving the input shaft through a V-belt drive having speed ratio of 2: 1. Draw the structural diagram, speed chart and determine the number of teeth on each gears.	Summer 2013	10
6	Draw speed ray diagram and layout for a six speed gear box .The output speed are 160 r.p.m. minimum and 1000 r.p.m. maximum. The motor speed is 1440 r.p.m.	Winter 2013	07
7	A three stage gear box with twelve speeds is to be designed based on R10 series with minimum spindle speed of 125 rpm. The second stage consists of three speed steps. The electric motor is connected to the gear box through a belt drive and runs at 1440 rpm and transmits of 5 kW. Using standard spindle speeds, 1. Draw the structure and speed diagram for the arrangement. 2. Determine the ratio of the belt pulley diameters. 3. Draw the gear box layout. 4. Determine the number of teeth on each gear of the gear box.	Summer 2013	10
8	Explain the procedure of designing multi speed gear box.	Winter 2013	07
9	Explain what is structural diagram and method of drawing structural diagram of gear box.	Winter 2013	04
10	A three stage gear box with twelve speeds is to be designed based on R10 series with minimum spindle speed of 125 rpm. The second stage consists of three speed steps. The electric motor is connected to the gear box through a belt drive and runs at 1440 rpm and transmits of 5 kW. Using standard spindle speeds, 1. Draw the structure and speed diagram for the arrangement. 2. Determine the ratio of the belt pulley diameters. 3. Draw the gear box layout. 4. Determine the number of teeth on each gear of the gear box.	October 2012	10

11	Draw speed ray diagram and layout for a six speed gear box .The output speed are 200 r.p.m. minimum and 1200 r.p.m. maximum. The motor speed is 1400 r.p.m.		
12	Explain deign procedure for 4 speed reduction gear box.		
13	What is ray diagram? Explain in brief.		
14	Explain deign procedure for 8 speed reduction gear box.		
15	A three stage gear box with twelve speeds is to be designed based on R15 series with minimum spindle speed of 145 rpm. The second stage consists of three speed steps. The electric motor is connected to the gear box through a belt drive and runs at 1440 rpm and transmits of 7 kW. Using standard spindle speeds, 1. Draw the structure and speed diagram for the arrangement. 2. Determine the ratio of the belt pulley diameters. 3. Draw the gear box layout. 4. Determine the number of teeth on each gear of the gear box.		
16	Design a suitable speed gear box for a head stock of a lathe that has a variation of speed from 120 r.p.m. to 750 r.p.m. in 8 steps. The power is supplied by an electric motor of 8 KW capacity running at 1150 r.p.m. and having driving the input shaft through a V-belt drive having speed ratio of 2: 1. Draw the structural diagram, speed chart and determine the number of teeth on each gears.		
17	Define method of drawing ray diagram of gear box.		
18	Explain Application and Uses of gear box in auto mobile industries.		
19	Give Advantages and Disadvantages of gear box.		
20	Draw speed ray diagram and layout for a four speed gear box .The output speed are 220 r.p.m. minimum and 1100 r.p.m. maximum. The motor speed is 1440 r.p.m.		

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Assignment No. 4 (DESIGN OF I .C. ENGINE COMPONENTS)			
Sr. No.	**Questions**	**Year**	**Marks**
1	Design the various components of a valve gear mechanism for a horizontal gas engine with the following data: Diameter of port is 70 mm, its weight is 5 N, and its lift is 25 mm. The maximum combustion pressure is 4.5 MPa. The valve opens 33^0 before O.D.C. and closes 1^0 after I.D.C. and it is to open with constant acceleration and deceleration for each half of the lift. The gas pressure in cylinder when the exhaust valve start to opens is 0.34 N/mm^2, the pressure on the top side of the valve may be taken as 0.1 N/mm^2 absolute and the greatest suction pressure is 0.035 N/mm^2 below atmospheric. The engine runs at 350 rpm. The effective length of each arm of the rocker lever is 175 mm and the included angle is 140^0.	Winter 2013	14
2	Design an overhung Crank shaft with two main bearings for an I. C. engine with the following data: i. Cylinder bore = 250 mm ii. Stroke length = 300 mm iii. Flywheel weight = 27 kN iv. Maximum pressure = 2.5 N/mm^2 v. Maximum torque at crank rotation = 1.7 N/mm^2 30° the pressure at that instant.	WINTER 2014	08
3	Design a tubular type pushrod for operating an exhaust valve of 4 stroke I. C. engine using the following data: i. Maximum force required to open the exhaust valve = 900 N ii. Ratio of l_p/l_w for rocker arm = 1.2 iii. Length of push rod = 110 mm iv. Ratio of inner diameter to outer diameter for tubular push rod = 0.75 v. Required factor of safety = 04 vi. Compressive yield strength for mild steel push rod = 350 N/mm^2 vii. Modulus of elasticity for mild steel = $210 \times 10_3$ N/mm^2	WINTER 2014	06
4	Find the thickness of a piston crown based on thermal considerations for 4 stroke engine with following specifications: i. Engine speed = 1500 rpm ii. Piston diameter = 87 mm iii. Length of stroke = 96 mm iv. Brake mean effective pressure = 0.7 N/mm^2 v. BSFC = 0.26 kg/kw-h vi. l/r ratio = 04 vii. Heat conducted through crown = 10% of heat generated during combustion viii. Calorific value of fuel = 42 MJ/kg ix. Assume that the piston is made of aluminium alloy with thermal conductivity of 175 w/m°c and allowable temperature difference of 111°c.	WINTER 2014	06
5	Design a connecting rod for 4 stroke petrol engine with the following data: i. Piston diameter = 0.10 m	WINTER 2014	08

	ii. Stroke length = 0.15 m iii. Length of connecting rod (centre to centre) = 0.30 m iv. Weight of reciprocating parts = 20 N v. Speed = 1500 rpm vi. Possible over speed = 2500 rpm vii. Compression ratio = 4:1 viii. Maximum explosion pressure = 2.5 MPa Assume suitable additional data if required.		
6	Following data refer to a 4-stroke petrol engine: Brake power=7.5 Kw, Indicated mean effective pressure=0.45 N/mm^2 ,Maximum explosion pressure=3.2 N/mm^2 , Mechanical efficiency = 80% ,Allowable stress for C.I. cylinder =40 MPa , Allowable stress for Ni-steel bolt = 70 N/mm^2 , Find:1) Bore and Stroke of engine taking L/D=1.25 , 2) Thickness of cylinder wall and flange , 3) Size and number of bolts required to join the cylinder head.	Winter 2013	10
7	Why an I-section is usually preferred to round section in case of connecting rods?	Winter 2013	04
8	Design a connecting rod for a high speed diesel engine from the following data: Cylinder bore = 100 mm, Stroke = 120 mm, Maximum speed = 1800 rpm, Compression ratio = 18, Max. Explosion pressure = 5 MPa, Mass of reciprocating parts = 3.5 Kg, Length of connecting rod = 240 mm, If the connecting rod is made of drop forged steel, determine the size of I-section, size of Small end bearing, big end bearing and bolts. Assume suitable stresses.	Winter 2013	10
9	Discuss about various section of connecting rod.	SUMMER 2014	04
10	Design a cast iron piston for single acting four stroke engine for following specification Cylinder Bore = 110 mm, Stroke = 130 mm, Maximum gas pressure = $5N/mm^2$ Brake mean effective pressure = 0.5 N/mm^2 , Fuel consumption = 0.2 kg/kw/hr, speed =2000 rev/min. Assume suitable data for C.I permissible tensile stress is 40 N/mm^2, HCV=41870 KJ/kg, K for C.I. = 46.6 Permissible tensile stress or piston ring is 100 N/mm^2, permissible tensile stress for pin is 150 N/mm^2.	SUMMER 2014	10
11	Explain about material for piston.	SUMMER 2014	04
12	Design a connecting rod for four stroke petrol engine for following data. Piston diameter =0.1 m Stroke=0.14 m, Length of C.R. =0.315 m Weight of reciprocating part =18.2 N Speed = 1500 rpm with over speed 2500 Compression ratio 4:1 Maximum explosion pressure = 2.45 MPa. F.O.S. =5 , For connecting rod σyield 380 N/mm^2, σultimate= 580 N/mm^2	SUMMER 2014	10
13	Design a connecting rod for a high speed diesel engine from the following data: Cylinder bore = 100 mm, Stroke = 120 mm, Maximum speed = 1800 rpm, Compression ratio = 18, Max. Explosion pressure = 5 MPa, Mass of reciprocating parts = 3.5 Kg, Length of connecting rod = 240 mm, If the connecting rod is made of drop forged steel, determine the size of I-section, size of small end bearing, big end bearing and bolts. Assume suitable stresses	SUMMER 2013	09
14	1) Why an I-section is usually preferred to round section in case of	SUMMER	05

	connecting rods? 2) What are the merits and demerits of wet and dry cylinder liners?	2013	
15	Determine the principle dimensions of cylinder for a vertical 4 stroke compression ignition engine from the following data: Brake power = 4.5 kW, Speed = 1200 rpm, Indicated mean effective pressure = 0.35 MPa, Mechanical efficiency = 80%.	SUMMER 2013	09
16	Describe the criteria for deciding the size of suction and exhaust valve of an I.C. engine.	SUMMER 2013	05
17	Design a plain carbon steel centre crankshaft for a single acting four stroke, single cylinder engine for the following data: Piston diameter = 250 mm; Stroke = 400 mm; Maximum combustion pressure = 2.5 MPa; Weight of the flywheel = 5 kg; Total belt pull = 100 N; Length of connecting rod = 950 mm. The flywheel is used as a pulley. When the crank has turned through 30^0 from top dead centre, the pressure on the piston is 1 MPa and the torque on the crank is maximum. Any other data required for the design may be assumed.	October 2012	14
18	Design the various components of a valve gear mechanism for a horizontal gas engine with the following data: Diameter of port is 70 mm, its weight is 5 N, and its lift is 25 mm. The maximum combustion pressure is 4.5 MPa. The valve opens 33° before O.D.C. and closes 1° after I.D.C. and it is to open with constant acceleration and deceleration for each half of the lift. The gas pressure in cylinder when the exhaust valve start to opens is 0.34 N/mm^2 , the pressure on the top side of the valve may be taken as 0.1 N/mm^2 absolute and the greatest suction pressure is 0.035 N/mm^2 below atmospheric. The engine runs at 350 rpm. The effective length of each arm of the rocker lever is 175 mm and the included angle is 140°.	October 2012	14
19	Design a connecting rod for a petrol engine from the following data: Diameter of piston = 110 mm; Mass of reciprocating parts = 2 kg; Length of connecting rod = 325 mm; Stroke = 150 mm; Speed = 1500 rpm with possible over speed of 1850 rpm; Compression ratio = 4:1; Factor of safety = 4; Maximum explosion pressure = 5.5 MPa Select suitable material and permissible stresses for its.	October 2012	08
20	The cylinder of a four stroke diesel engine has the following specifications: Brake power = 7.5 kW; Speed = 1400 rpm; Maximum gas pressure = 3.5 MPa; Indicated mean effective pressure = 0.35 MPa; Mechanical efficiency = 80 %; The cylinder liner and head are made of grey cast iron (S_{ut} = 260 MPa and μ = 0.25). The factor of safety for all parts is 6. Calculate: 1. Bore and length of the cylinder liner 2. Thickness of the cylinder liner (Take, C= 3.2 mm) 3. Thickness of the cylinder head.	October 2012	08

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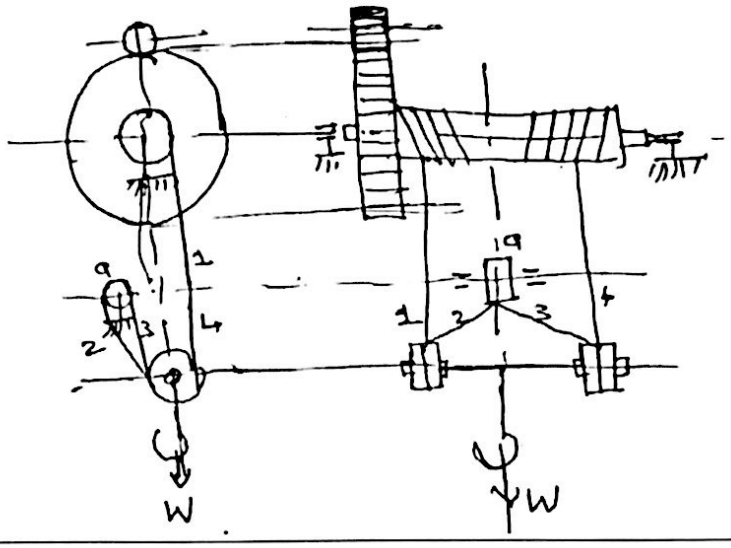
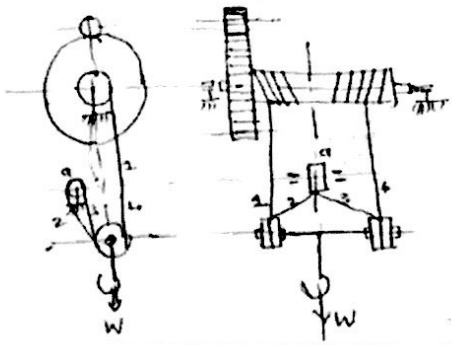
Assignment No. 5 (DESIGN OF MATERIAL HANDLING EQUIPMENTS)			
Sr. No.	**Questions**	**Year**	**Marks**
1	Explain design procedure designing belt conveyors.	May 2012 Summer 2014	07
2	Classify the conveyors. Explain construction and working of any one conveyor.	May 2012 Summer 2013 Winter 2014	07
3	Explain the gear material and heat treatment.	Winter 2013	04
4	Explain the complete designation of steel wire ropes and various types of stresses induced in a wire rope.	Winter 2014	06
5	Design a wire rope for a lift using following details: i. Number of ropes = 02 ii. Maximum load on the ropes including the cabin weight = 8 kN iii. Tensile strength of 6×19 wire rope = 43.5 d_2 kN where d = Rope diameter in cm. iv. Factor of safety = 12 and assume necessary data.	Winter 2014	08
6	Find the main dimensions of a cast iron rope drum from the following data for winding rope (two sides): i. Maximum load to be lifted = 40 kN ii. Diameter of wire rope = 14 mm iii. Lifting height = 10 m iv. Number of falls = 04 v. Drum diameter is 30 times rope diameter vi. Allowable stress for cast iron = 25 MPa vii. Use two movable sheaves.	Winter 2014	08
7	Explain classification and working of different types of conveyors	Winter 2014	06
8	What are the merits and demerits of wet and dry cylinder liners?	Winter 2013	04
9	Design a crane hook for lifting capacity of 5 tonnes. It is made from forged steel and has triangular section. Take permissible tensile stress 80 N/mm^2 .Use data design book to standardize the dimension of hook.	Winter 2013	10
10	Classify the material handling equipments.	Winter 2013	04
11	Select the ropes and drum for an over head travelling crane with a lifting magnet. Lifting capacity = 5000 kg (mass) Weight of lifting magnet = 200 kg (mass) Weight of lifting tackle = 120 kg (mass) Lifting height = 8 m No. of rope parts = 4	Winter 2013	10

			
12	Classify the belt conveyors	Winter 2013	04
13	Explain the design procedure of screw conveyor	Summer 2014	07
14	Explain design of flat belt conveyor	Summer 2014	07
15	Explain design procedure of wire rope drum.	Summer 2014	07
16	What do you understand by 6 x 37 ropes? Explain with neat sketch the different rope section.	Summer 2014	07
17	Differentiate between screw conveyor and vibratory conveyor	Summer 2013	04
18	Select the ropes, pulleys and drum for an over head travelling crane with a lifting magnet. Lifting capacity = 4500 kg (mass),Weight of lifting magnet = 210 kg (mass),Weight of lifting tackle = 110 kg (mass), Lifting height = 8.5 m, No. of rope parts = 4. 	Summer 2013	10
19	With neat sketches, explain the different types of idler used in conveyors	Summer 2013	07
20	With neat sketches, explain the different types of idler used in conveyors.	Summer 2013	07

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