15	Design a connecting rod for an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm2. The diameter of the piston is 100 mm ; mass of the reciprocating parts per cylinder 2.25 kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6 : 1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm2 and 15 N/mm2. The density of material of the rod may be taken as 8000 kg/m3 and the allowable stress in the bolts as 60 N/mm2 and in cap as 80 N/mm2. The rod is to be of I-section for which you can choose your own proportions. Draw a neat dimensioned sketch showing provision for lubrication. Use Rankine formula for which the numerator constant may be taken as 320 N/mm2 and the denominator constant	10	
	OR		
16	A four stroke diesel engine has the following specifications : Brake power = 5 kW ; Speed = 1200 r.p.m. ; Indicated mean effective pressure=0.35N/ mm2;Mechanical efficiency = 80 %. Determine : 1. bore and length of the cylinder ; 2. thickness of the cylinder head ; and 3. size of studs for the cylinder head.	10	3
17	A pump is driven by an electric motor through a open type flat belt drive. Determine the belt specifications for the following data. Motor pulley diameter(dS) = 300 mm, Pump pulley diameter(dL) = 600 mm Coefficient of friction (μS) for motor pulley = 0.25 Coefficient of friction (μL) for pump pulley = 0.20 Center distance between the pulleys=1000 mm; Rotational speed of the motor=1440 rpm; Power transmission = 20kW; density of belt material (ρ)= 1000 kg/m3 ; allowable stress for the belt material (σ) = 2 MPa; thickness of the belt = 5mm	10	4
	OR		

	the belt material (σ) = 2 MPa; thickness of the belt = 5mm		
	OR		
18	Design a leaf spring for the following specifications: Total load = 140 kN; Number of springs supporting the load = 4; Maximum number of leaves = 10; Span of the spring = 1000 mm; Permissible deflection = 80 mm. Take Young's modulus, E = 200 kN/mm2 and allowable stress in spring material as 600 MPa.	10	4
19	A reciprocating compressor is to be connected to an electric motor with the help of spur gears. The distance between the shafts is to be 500 mm. The speed of the electric motor is 900 r.p.m. and the speed of the compressor shaft is desired to be 200 r.p.m. The torque, to be transmitted is 5000 N-m. Taking starting torque as 25% more than the normal torque, determine : 1. Module and face width of the gears using 20 degrees stub teeth, and 2. Number of teeth and pitch circle diameter of each gear. Assume suitable values of velocity factor and Lewis factor.	10	5
	OR		
20	A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10 000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given (σ) es = 618 MPa.	10	5

	Part-B		
Answer All the following questions.			
11	A 150mm diameter shaft supporting a load of 10KN has a speed of 1500rpm.The shaft run in whose bearing length is 1.5 times the shaft diameter. If the diametric clearance of bearing is 0.15mm and the absolute viscosity of the oil at the operating temperature is 0.011 Kg/m-s. Fnd the power wasted in friction.	10	1
	OR		
12	A full journal bearing of 50mm diameter and 100mm long has a bearing pressure of 1.4N/mm2• The speed of the journal is 900rpm and the ratio of journal diameter to the diametric clearance is 1000. The bearing is lubricated with oil, whose absolute viscosity at the operating temperature of 75°C may be taken as 0.011 kg/m-s. The room temperature is 350C.Find, (1)The amount of artificial cooling required. (2)The mass of lubricating oilrequired, if the difference between the outlet and inlet temperature of the oilis 10°C. Take specific heat of oil as 1850J/Kg/0C.	10	1
13	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load	10	2
	OR		
14	A shaft rotating at constant speed is subjected to variable load. The bearings supporting the shaft are subjected to stationary equivalent radial load of 3 kN for 10 per cent of time, 2 kN for 20 per cent of time, 1 kN for 30 per cent of time and no load for remaining time of cycle. Ifthe total life expected for the bearing is 20 × 106 revolutions at 95 per cent reliability, calculate dynamic load rating of the ball bearing		

All the following questions carry equal marks

Q.NO	QUESTIONS	Marks	CO attai
1	Define Basic dynamic load rating in rolling contact bearings	2	1
2	Write some guide lines for selecting a proper type of bearing	2	1
3	What are the methods and materials used in the manufacture of crankshafts?	2	2
4	State the function of the ribs for an IC engine piston	2	2
5	What are the uses and construction of wire ropes. How is wire rope ends fastened?	2	3
6	Write the relation for the ratio of driving tensions of a V-belt.	2	3
7	Discuss design procedure for spur gears	2	5
8	Derive equation for formative number of teeth in helical gears?	2	5
9	Write a short notes on design of springs	2	4
10	Explain classification of springs	2	4
	Part-B		
	Answer All the following questions.		

(10x2M=20 Marks)

Q.NO	QUESTIONS	Marks	CO attainment	Blooms Taxonomy Level
1	Write short note on classifications and different types of antifriction bearings	2	1	understanding
2	Define Basic static load rating in rolling contact bearings	2	1	Remembering
3	At what angle of the crank the twisting moment is maximum in the crank shaft?	2	2	Application
4	What are the methods and materials used in the manufacture of piston	2	2	understanding
5	State the advantages and disadvantages of the chain drive over belt and rope drive	2	3	Remembering
6	What are the advantages and disadvantages of V-belt drive over flat belt drive?	2	4	Understandings
7	write design procedure for spur gears	2	5	Understanding
8	Write equation for formative number of teeth in helical gears?	2	5	Understanding
9	Write a short notes on design of springs	2	4	Application
10	What are the different of springs	2	4	Remembering
Part-B				

Part-B

Answer All the following questions.

11	Design a journal bearing for a centrifugal pump from the following data: Load on the journal=20000N, Speed of the journal=900rpm, Type of oil is SAE lO, for which the absolute viscosity at 55°C=0.017kg/m-s, Ambient temperature of oil = 15.50C, Maximum bearing pressure for the pump=1.5N/mm2 .Calculate also mass of the lubricating oil required for artificial cooling, If the rise of temperature, if the rise of temperature of oil be limited to lOoC heat dissipation coefficient=1232W/m2 / oC	10	1
	OR		
12	Design a journal bearing for a centrifugal pump with the following data: Diameter of the journal= 150mm Load on bearing =40KN Speed of journal =900rpm	10	1
13	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load.	10	2
	OR		
14	The rolling contact ball bearing are to be selected to support the overhung countershaft. The shaft speed is 720 r.p.m. The bearings are to have 99% reliability corresponding to a life of 24 000 hours. The bearing is subjected to an equivalent radial load of 1 kN. Consider life adjustment factors for operating condition and material as 0.9 and 0.85 respectively. Find the basic dynamic load rating of the bearing from manufacturer's catalogue, specified at 90% reliability.	10	2
15	Design a cast iron piston for a single acting four stroke engine for the following	10	3

15	**Design a cast iron piston for a single acting four stroke engine for the following data:** **Cylinder bore = 100 mm ; Stroke = 125 mm ; Maximum gas pressure = 5 N/mm2 ; Indicated mean effective pressure = 0.75 N/mm2 ; Mechanical efficiency = 80% ; Fuel consumption = 0.15 kg per brake power per hour ; Higher calorific value of fuel = 42 × 103 kJ/kg ; Speed = 2000 r.p.m.** **Any other data required for the design may be assumed.**	10	3
	OR		
16	Design a connecting rod for an I.C. engine running at 1800 r.p.m. and developing a maximum pressure of 3.15 N/mm2. The diameter of the piston is 100 mm ; mass of the reciprocating parts per cylinder 2.25 kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6 : 1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10 N/mm2 and 15 N/mm2. The density of material of the rod may be taken as 8000 kg/m3 and the allowable stress in the bolts as 60 N/mm2 and in cap as 80 N/mm2. The rod is to be of I-section for which you can choose your own proportions. Draw a neat dimensioned sketch showing provision for lubrication. Use Rankine formula for which the numerator constant may be taken as 320 N/mm2 and the denominator constant 1 / 7500.	10	3
17	Design a helical compression spring for a maximum load of 1000 N for a deflection of 25 mm using the value of spring index as 5. The maximum permissible shear stress for spring wire is 420 MPa and modulus of rigidity is 84 kN/mm2.	10	4

	OR	
18	A pump is driven by an electric motor through a open type flat belt drive. Determine the belt specifications for the following data. Motor pulley diameter(d_s) = 300 mm, Pump pulley diameter(d_L) = 600 mm Coefficient of friction (μ_s) for motor pulley = 0.25 Coefficient of friction (μ_L) for pump pulley =0.20 Center distance between the pulleys=1000 mm; Rotational speed of the motor=1440 rpm; Power transmission = 20kW; density of belt material (ρ)= 1000 kg/m^3 ; allowable stress for the belt material (σ) = 2 MPa; thickness of the belt =5mm.	10
19	A gear drive is required to transmit a maximum power of 22.5 kW. The velocity ratio is 1:2 and r.p.m. of the pinion is 200. The approximate centre distance between the shafts may be taken as 600 mm. The teeth has 20° stub involute profiles. The static stress for the gear material (which is cast iron) may be taken as 60 MPa and face width as 10 times the module. Find the module, face width and number of teeth on each gear. Check the design for dynamic and wear loads. The deformation or dynamic factor in the Buckingham equation may be taken as 80 and the material combination factor for the wear as 1.4.	10
	OR	
20	A pair of 20° full depth involute teeth bevel gears connect two shafts at right angles having velocity ratio 3 : 1. The gear is made of cast steel having allowable static stress as 70 MPa and the pinion is of steel with allowable static stress as 100 MPa. The pinion transmits 37.5 kW at 750 r.p.m. Determine : 1. Module and face width; 2. Pitch diameters; and 3. Pinion shaft diameter. Assume tooth form factor	10

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	OR	
18	A pump is driven by an electric motor through a open type flat belt drive. Determine the belt specifications for the following data. Motor pulley diameter(d_s) = 300 mm, Pump pulley diameter(d_L) = 600 mm Coefficient of friction (μ_s) for motor pulley = 0.25 Coefficient of friction (μ_L) for pump pulley = 0.20 Center distance between the pulleys=1000 mm; Rotational speed of the motor=1440 rpm; Power transmission = 20kW; density of belt material (ρ)= 1000 kg/m^3 ; allowable stress for the belt material (σ) = 2 MPa; thickness of the belt =5mm.'	10
19	A gear drive is required to transmit a maximum power of 22.5 kW. The velocity ratio is 1:2 and r.p.m. of the pinion is 200. The approximate centre distance between the shafts may be taken as 600 mm. The teeth has 20° stub involute profiles. The static stress for the gear material (which is cast iron) may be taken as 60 MPa and face width as 10 times the module. Find the module, face width and number of teeth on each gear. Check the design for dynamic and wear loads. The deformation or dynamic factor in the Buckingham equation may be taken as 80 and the material combination factor for the wear as 1.4.	10
	OR	
20	A pair of 20° full depth involute teeth bevel gears connect two shafts at right angles having velocity ratio 3 : 1. The gear is made of cast steel having allowable static stress as 70 MPa and the pinion is of steel with allowable static stress as 100 MPa. The pinion transmits 37.5 kW at 750 r.p.m. Determine : 1. Module and face width; 2. Pitch diameters; and 3. Pinion shaft diameter. Assume tooth form factor	10

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	the shafts may be taken as 600 mm. The teeth has 20° stub involute profiles. The static stress for the gear material (which is cast iron) may be taken as 60 MPa and face width as 10 times the module. Find the module, face width and number of teeth on each gear. Check the design for dynamic and wear loads. The deformation or dynamic factor in the Buckingham equation may be taken as 80 and the material combination factor for the wear as 1.4.	
	OR	
20	A pair of 20° full depth involute teeth bevel gears connect two shafts at right angles having velocity ratio 3 : 1. The gear is made of cast steel having allowable static stress as 70 MPa and the pinion is of steel with allowable static stress as 100 MPa. The pinion transmits 37.5 kW at 750 r.p.m. Determine : 1. Module and face width; 2. Pitch diameters; and 3. Pinion shaft diameter. Assume tooth form factor, $y = 0.154 - 0.912$, where T is the formative number of teeth, width = 1/3 rd the length	10

Q.NO	QUESTIONS	Marks	CO attainn
1	What is meant by hydrodynamic lubrication?	2	1
2	Define Basic static load rating in rolling contact bearings	2	1
3	At what angle of the crank the twisting moment is maximum in the crank shaft?	2	2
4	Where do you use self-aligning ball bearings and spherical roller bearings	2	2
5	What are the methods and materials used in the manufacture of crankshafts?	2	3
6	What are the forces that act on the piston head of an internal combustion engine	2	4
7	What are the advantages and disadvantages of V-belt drive over flat belt drive?	2	5
8	write design procedure for spur gears	2	5
9	Write equation for formative number of teeth in helical gears?	2	4
10	Write a short notes on design of springs	2	4
Part-B			
Answer All the following questions. (10M X 5=50Marks)			

Part-B

Answer All the following questions. (10M X 5=50Marks)

11	Design a journal bearing for a centrifugal pump with the following data: Diameter of the journal = 150mm Load on bearing = 40KN Speed of journal = 900rpm.	10
	OR	
12	A 150mm diameter shaft supporting a load of 10KN has a speed of 1500rpm.The shaft run in whose bearing length is 1.5 times the shaft diameter. If the diametric clearance of bearing is 0.15mm and the absolute viscosity of the oil at the operating temperature is 0.011 Kg/m-s. Find the power wasted in friction	10
13	A ball bearing subjected to a radial load of 8000N is expected to have a satisfactory life of 8000 hours at 2450r.p.m with a reliability of 97%.Calculate the dynamic load capacity of the bearing.	10
	OR	
14	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load	

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14	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load		
15	Design a connecting rod for an I.C. engine running at 1800 r.p.m and developing a maximum pressure of 3.15 N/mm2. The diameter of the piston is 100 mm; mass of the reciprocating parts per cylinder 2.25kg; length of connecting rod 380 mm; stroke of piston 190 mm and compression ratio 6:1. Take a factor of safety of 6 for the design. Take length to diameter ratio for big end bearing as 1.3 and small end bearing as 2 and the corresponding bearing pressures as 10N/mm2 and 15 N/mm2. The density of material of the rod may be taken as 8000kg/m3 and the allowable stress in the bolts as 60 N/mm2 and in cap as 80 N/mm2. The rod is to be of I-section for which you can choose your own proportions.. Use Rankine formula for which the numerator constant may be taken as 320 N/mm2 and the denominator 1/7500.	10	3
	OR		

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	OR		
16	The following data is given for the piston of a four-stroke diesel engine: Cylinder bore = 250 mm Maximum gas pressure = 4 MPa Bearing pressure at small end of connecting rod = 15 MPa Length of piston pin in bush of small end = 0.45D Ratio of inner to outer diameter of piston pin = 0.6 Mean diameter of piston boss = 1.4 Y outer diameter of piston pin Allowable bending stress for piston pin = 84 N/mm2 Calculate: (i) outer diameter of the piston pin; (ii) inner diameter of the piston pin; (iii) mean diameter of the piston boss; and (iv) check the design for bending stresses.	10	3
17	Design a belt drive pulley for transmitting 15kW at 280 rpm. The velocity of the belt is not to exceed 10m/s, and the maximum tension is not to exceed 15N/mm width. The tension on the slack is one half of that on the tight side. Determine: a.Width of the pulley b.Diameter of the pulley.	10	4
	OR		
18	Design a leaf spring for the following specifications: Total load = 140 kN; Number of springs supporting the load = 4; Maximum number of leaves = 10; Span of the spring = 1000 mm; Permissible deflection = 80 mm. Take Young's modulus, E = 200 kN/mm2 and allowable stress in spring material as 600 MPa	10	4
19	The following particulars of a single reduction spur gear are given, Gear ratio=10:1; Distance between centers =660mm approximately; pinion transmits 500kw at 1800rpm; Involutes teeth of	10	5

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	OR		
18	Design a leaf spring for the following specifications: Total load = 140 kN; Number of springs supporting the load = 4; Maximum number of leaves = 10; Span of the spring = 1000 mm; Permissible deflection = 80 mm. Take Young's modulus, E = 200 kN/mm2 and allowable stress in spring material as 600 MPa	10	4
19	The following particulars of a single reduction spur gear are given, Gear ratio=10:1; Distance between centers =660mm approximately; pinion transmits 500kw at 1800rpm; Involutes teeth of standard proportions (addendum=1m) with pressure angle of 22.50; Permissible normal pressure between teeth =175N per mm of width. Find: i. The nearest standard module if no interference is to occur. ii. The number of teeth on wheel; iii. The necessary width of pinion . iv. The load on the bearings of the wheels due to power transmitted.	10	5
	OR		
20	A helical cast steel gear with 30° helix angle has to transmit 35 kW at 1500 r.p.m. If the gear has 24 teeth, determine the necessary module, pitch diameter and face width for 20° full depth teeth. The static stress for cast steel may be taken as 56 MPa. The width of face may be taken as 3 times the normal pitch. What would be the end thrust on the gear? The tooth factor for 20° full depth involute gear may be taken as 0.154-0.912/TE where TE represents the equivalent number of teeth.	10	5

All the following questions carry equal marks **(10x2M**

Q.NO	QUESTIONS	Marks	CO attainment	Blooms Level
1	State any four desirable properties of a good bearing material	2	1	understa
2	Why are taper roller bearings used in pairs?	2	1	Rememb
3	Write short note on classifications and different types of antifriction bearings	2	2	Applicati
4	What are the methods and materials used in the manufacture of crankshafts?	2	2	understan
5	How do you classify springs and name them?	2	3	Rememberi
6	Discuss design procedure for spur gears	2	4	Understand
7	What are the uses and construction of wire ropes. How is wire rope ends fastened?	2	5	Understandi
8	Write the relation for the ratio of driving tensions of a V-belt.	2	5	Understandi
9	Derive equation for formative number of teeth in helical gears?	2	4	Application
10	Why is the pinion weaker than the gear made of same material?	2	4	Remembering
Part-B				

Answer All the following questions. **(10M X 5=50Marks)**

11	The following data is given for a full hydrodynamic bearing used for electric motor: radial load = 1200 N journal speed = 1440 rpm journal diameter = 50 mm static load on the bearing = 350 N. The values of surface roughness (cla) of the journal and the bearing are 2 and 1 micron respectively. The minimum oil fi lm thickness should be five times the sum of surface roughness of the journal and the bearings. Determine (i) length of the bearing; (ii) radial clearance; (iii) minimum oil fi lm thickness; (iv) viscosity of lubricant; and (v) flow of lubricant. Select a suitable oil for this application assuming the operating temperature as 65°C.	10	1	Unde
	OR			
12	Design a journal bearing for a centrifugal pump with the following data: Diameter of the journal = 150mm Load on bearing = 40KN Speed of journal= 900rpm	10	1	Rememb
13	The rolling contact ball bearings are to be selected to support the overhung countershaft. The shaft	10	2	Applicatio

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13	The rolling contact ball bearings are to be selected to support the overhung countershaft. The shaft speed is 720r.p.m. The bearings are to have 99% reliability corresponding to a life of 24000 hours. The bearing is subjected to an equivalent radial load of 1kN. Consider life adjustment factors for operating condition and material as 0.9 and 0.85 respectively. Find the basic dynamic load rating of the bearing from manufacture's catalogue, specified at 90% reliability.	10	2
	OR		
14	Select a single row deep groove ball bearing for a radial load of 4000 N and an axial load of 5000 N, operating at a speed of 1600 r.p.m. for an average life of 5 years at 10 hours per day. Assume uniform and steady load		

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15	A four stroke diesel engine has the following specifications : Brake power = 5 kW ; Speed = 1200 r.p.m. ; Indicated mean effective pressure=0.35N/ mm2;Mechanical efficiency = 80 %. Determine : 1. bore and length of the cylinder ; 2. thickness of the cylinder head ; and 3. size of studs for the cylinder head	10	3
	OR		
16	Design a cast iron piston for a single acting four stroke engine for the following data: Cylinder bore = 100 mm ; Stroke = 125 mm ; Maximum gas pressure = 5 N/mm2 ; Indicated mean effective pressure = 0.75 N/mm2 ; Mechanical efficiency = 80% ; Fuel consumption = 0.15 kg per brake power per hour ; Higher calorific value of fuel = 42 × 103 kJ/kg ; Speed = 2000 r.p.m. Any other data required for the design may be assumed.	10	3
17	A pump is driven by an electric motor through a open type flat belt drive. Determine the belt specifications for the following data. Motor pulley diameter(dS) = 300 mm, Pump pulley diameter(dL) = 600 mm Coefficient of friction (μS) for motor pulley = 0.25 Coefficient of friction (μL) for pump pulley = 0.20 Center distance between the pulleys=1000 mm; Rotational speed of the motor=1440 rpm;	10	4

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	r.p.m. Any other data required for the design may be assumed.		
17	A pump is driven by an electric motor through a open type flat belt drive. Determine the belt specifications for the following data. Motor pulley diameter(dS) = 300 mm, Pump pulley diameter(dL) = 600 mm Coefficient of friction (μS) for motor pulley = 0.25 Coefficient of friction (μL) for pump pulley = 0.20 Center distance between the pulleys=1000 mm; Rotational speed of the motor=1440 rpm; Power transmission = 20kW; density of belt material (ρ)= 1000 kg/m3 ; allowable stress for the belt material (σ) = 2 MPa; thickness of the belt = 5mm	10	4
	OR		
18	The spring loaded safety valve for a boiler is required to blow off at a pressure of 10 kg/sq cm. The diameter of the valve is 6 cm, and the maximum lift of the valve is 1·5 cm. Design the suitable compression spring for the safety valve assuming the spring index to be 6 and providing initial compression of 3 cm. The maximum shear stress in the material of the wire is limited to 4,500 kg/sq cm. G = 0·84 x 10 Kg/Sq cm.	10	4
19	A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10 000	10	5

	to 4,500 kg/sq cm. G = 0·84 x 10 Kg/Sq cm.		
19	A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10 000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given (σ) es = 618.MPa	10	5
	OR		
20	The following particulars of a single reduction spur gear are given, Gear ratio=10:1; Distance between centers =660mm approximately; pinion transmits 500kw at 1800rpm; Involutes teeth of standard proportions (addendum=1m) with pressure angle of 22.50; Permissible normal pressure between teeth =175N per mm of width. Find: i. The nearest standard module if no interference is to occur. ii. The number of teeth on wheel; iii. The necessary width of pinion iv. The load on the bearings of the wheels due to power transmitted.	10	5

	to 4,500 kg/sq cm. G = 0·84 x 10 Kg/Sq cm.		
19	A pair of helical gears are to transmit 15 kW. The teeth are 20° stub in diametral plane and have a helix angle of 45°. The pinion runs at 10 000 r.p.m. and has 80 mm pitch diameter. The gear has 320 mm pitch diameter. If the gears are made of cast steel having allowable static strength of 100 MPa; determine a suitable module and face width from static strength considerations and check the gears for wear, given (σ) es = 618 MPa	10	5
	OR		
20	The following particulars of a single reduction spur gear are given, Gear ratio=10:1; Distance between centers =660mm approximately; pinion transmits 500kw at 1800rpm; Involutes teeth of standard proportions (addendum=1m) with pressure angle of 22.50; Permissible normal pressure between teeth =175N per mm of width. Find: i. The nearest standard module if no interference is to occur. ii. The number of teeth on wheel; iii. The necessary width of pinion iv. The load on the bearings of the wheels due to power transmitted.	10	5