

SaiNath University

Assignment For Diploma in Mechanical Engineering 5th Sem.

The Assignment will consist of two parts, A and B. Part A will have 5 short answer questions (40-60 words) of 4 marks each. Part B will have 2 long answer questions of 10 marks each

All questions are compulsory.

These Assignments should be completed and submitted in written form by the student to his/her respective Faculty/ Examiners. Assignment Submission Dates are:

➤ Nov-17

List Of Suggested Questions

The list of suggested questions are for students to practice. Although optional, we recommend that students solve these questions, as they will help them in preparing for exams as well as in clearing the important concepts of the subject.

List of Practical and suggested practical's

The list of practical's should be done by the students in their Lab Sessions. These are the basic practical's, which each student should be able to do himself independently. While the list of suggested practicals are optional, but it is recommended that students should perform those practical so as to have a thorough knowledge of the subject

Education Delivery Schedule (EDS)

As per University Semester scheme, the minimum contact hours of each paper has been Divided into two hours theory and practical class.

The faculty will maintain this attendance paper wise for his/her batch.

Subject Code	Subject Name
DEME-501	Industrial Organization & supervisory Management
DEME-502	Fluid Power
DEME-503	Advanced Manufacturing Process
DEME-504	Machine Design
DEME-505	Metrology & Quality Control
DEME-506	Practical Machine Design



SAI NATH UNIVERSITY

Cover page of Assignment

ID NUMBER

NAME

COURSE Diploma Engineering.....

STREAM Mechanical.....

SEM 5th.....

SUBJECT CODE

SUBJECT NAME

Assignments will be completed by the Student in his/her own handwriting.

DEME-501

[Industrial Organization & supervisory Management]

Part A

1. Explain the relationship between employers and employees, the link between work and pay ?
2. What is types of management responsibility - to the organization and for subordinates ?
3. Explain business organization, the division and specialization of labour, forming workgroups.
4. How to explain employee counseling , disciplinary action, equal opportunity policy, matters regarding promotion?
5. Explain Communication: two-way, the effects on motivation and benefits of good communication.?

Part B

1. Company XYZ has an annual demand of 1,000 units. The ordering cost is Rs. 100 per order and the carrying cost is Rs. 100 per unit. If the stock-out cost is Rs. 400 each time the company runs out-of-stock, determine the safety stock required that would justify the carrying cost?
2. What are the various environmental factors that a manager should consider in an Organization .
3. Trace the evolution of management with reference to the contributions made by management thinkers.
4. What is the role of scientific management in the modern era .

DEME-502 [Fluid Power]

Part A

1. Explain the working of an external gear pump with a neat sketch.
2. A single reciprocating pump has a plunger diameter of 250 mm and a stroke of 350 mm .If the speed of the pump is 60 rpm and delivers 16.5lps. Find (a) theoretical discharge (b) coefficient of discharge (c) slip and (d) percentage of slip.
3. The diameters of a pipe at section 1 and 2 are 15 cm and 20 cm respectively.Find the discharge through the pipe if velocity of water at section 1 is 4 m/s .Determine also the velocity at section 2 .
4. A jet of water 80 mm diameter with a velocity of 15 m/sec and strikes a series of vanes moving with a velocity of 10 m/sec. Find (a) force exerted by the jet. (b) Work done by the jet.
5. A venture meter of size 300 x 100 mm is fitted to the horizontal pipe. Mercury the manometer is connected to the venture meter reads 100 mm. Find the discharge of through the pipe, if co efficient of venture meter is 0.98 ?

Part B

1. A left limb of an U – tube manometer is opened to atmosphere and right limb is connected to the pipe carrying water pressure. The center of the pipe is at the level of free surface of mercury. Find the difference in the level of mercury in the limbs, if the absolute pressure of water in the pipe is 15 m of water.
2. A horizontal nozzle discharging into the atmosphere. The inlet has a bore area of 600 mm² and the exit has a bore area of 200 mm² . Calculate the flow rate when the inlet pressure is 400 Pa. Assume there is no energy loss.
3. Define (i) hydraulics co efficient. (ii) Define hydraulic gradient line and wetted perimeter. (iii) State and prove Bernoulli's theorem.
4. A circular ring of 2.5m external and 1.5 m internal diameters is vertically immersed in water such that the center of the plate is 3.6 m deep from the free surface of water. Determine the total pressure and depth of the center of pressure.

DEME-503

[Advanced Manufacturing Process]

Part A

1. Differentiate between PAM and LBM with respect to principle, MRR, and suitability of machining .
2. With neat sketch, write step by step process of Wire Cut EDM. State any two applications also.
3. Write differentiate between dressing and truing of grinding wheel with respect to need, tools, and effects of not doing it
4. An indexing device has brown & sharp plates as given below, Plate No 1 – 15, 16, 17, 18, 19, 20 Plate No 2 – 21, 23, 27, 29, 31, 33 Plate No 3 – 37, 39, 41, 43, 47, 49
A gear is to be cut with 60 teeth. Calculate No of turns of index plate using simple indexing method. Also calculate No of turns of index plate for cutting gear of 35 teeth using appropriate index plate.
5. With neat sketch, describe the construction of column and knee type milling machine stating function of each part.

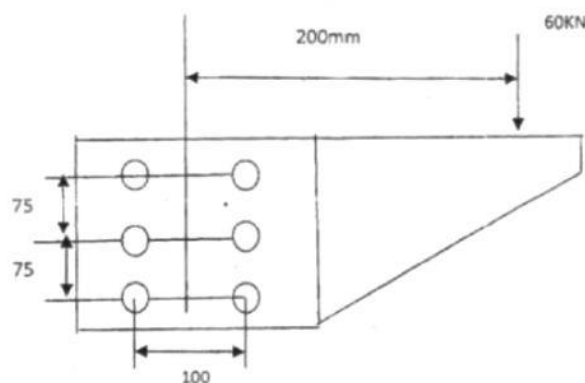
Part B

1. Following are the machining requirements. Select appropriate non-traditional machining method for each with justification
 - i. Deep drilling
 - ii. Machining of injection mouldingmould
 - iii. Profile cutting of turbine blade
 - iv. Die block used in press tools
2. Describe construction and working of column and knee type milling machine with neat sketch.
3. Small MS pin of 10 mm dia and 80 mm long are to be ground on external surface in the batch of 5000. Select suitable grinding process for mass production with justification. Draw neat sketch and describe the process with respect to operation.
4. With a neat sketch, describe working principle of honing process. State its two applications.

DEME-504 [Machine Design]

Part A

1. Determine the size of the circular bar using Soderberg equation with FOS-2.5 if it is subjected to tensile force varying 300kN to 550kN. It is made of carbon steel 35C8 with $\sigma_{yt}=320\text{N/mm}^2$ and $\sigma_{at}=600\text{ N/mm}^2$.
2. Select a standard hook of trapezoidal cross section to lift a load of 110kN and find the stress induced at critical cross section.
3. A steel shaft is supported at bearing A and B 750mm apart. A spur gear having PCD 400mm is located 150mm to the right of LH bearing and a pinion with PCD 120mm is mounted 350mm to the left of RH bearing. The gear is drive by the pinion located vertically below, while the pinion transmits power to another gear horizontally to the right. Using allowable shear stress 60MPa, determine the diameter of the shaft. The shaft transmitting 10KW at 200 rpm. Shock and Fatigue factor in bending and torsion
a) Design a Clamp coupling for mild steel shaft transmitting 40 KW at 100 rpm. Coefficient of friction between the muff and the shaft surface is 0.3 and number of bolts connecting two halves are six. The allowable shear stress in the shaft and coupling bolts are 40MPa and 70MPa respectively.
4. Design a Clamp coupling for mild steel shaft transmitting 40 KW at 100 rpm. Coefficient of friction between the muff and the shaft surface is 0.3 and number of bolts connecting two halves are six. The allowable shear stress in the shaft and coupling bolts are 40MPa and 70MPa respectively .
5. A Bracket is supported by means of 6 bolts of same size as shown. Determine the diameter of the bolts if the maximum shear stress is 150MPa .



Part B

1. A laminated spring 500mm long and 40mm wide is held together at the centre by a band 85mm wide. If the thickness of each leaf is 10mm, find the number of leaves required to carry a load of 5400N. Assume maximum working stress of 280MPa. If the two of the leaves extend the full length of the spring, find the deflection of the spring. The young modulus for the spring material is 210GPa
2. Design a knuckle joint to withstand a tensile load of 25kN if the permissible stresses are 56MPa in tension, 40 MPa in shear and 70 MPa in compression.
3. Find outer diameter of the cylinder made of CGI-FG300 using Lame's equation if the maximum internal pressure is 30MPa, FOS is 2 and internal diameter is 250mm.
4. Select a standard hook of trapezoidal cross section to lift a load of 110kN and find the stress induced at critical cross section.

DEME-505

[Metrology & Quality Control]

Part A

1. What is the difference between Alignment test & performance test? Explain with neat sketch any four such tests on a Lathe machine.
2. Explain with sketch the principle and working of sigma comparator? State its advantages & limitations and difference between primary & secondary texture.
3. Show that the best wire size for measuring effective diameter of thread is given by $d = (p/2) \sec(\theta/2)$, where p = pitch of the thread, θ = Thread angle.
4. A shaft of 35 ± 0.004 mm is to be checked by means of GO-NOGO gauge. Design the dimensions of the gauge required.
5. Describe use of Devid Brown tangent comparator for gear measurement. Calculate the dimension of the Base tangent length over 3 teeth with module of 2.5 mm, 20° Pressure angle & 30 teeth.

Part B

1. Write short notes -
 - i) Lasers in metrology
 - ii) Floating carriage micrometer
 - iii) Constant chord method for gear tooth thickness

2. थ्रॉटल सॉल्यूशन के अंश में विचारित उमर x के तहत t वित्त 10 उमर में विप्रम 5 मंभीण बंसनसंजम बवदजतवस सपउपजे वित्त उमर बीतज के तहत बीतज कमजमतउपदमीमजीमत जीम चतवबमे पे नदकमत बवदजतवस वत दवजण

उमर छवण त्र	1	2	3	4	5	6	7	8	9	10
x त्र	31	38	34	30	38	35	33	33	38	35
t त्र	4	2	5	5	19	4	14	7	9	5

बवउचवदमदज चमबपिबंजपवद सपउपजे 40 37 0 1 एजम 12 त्र 0 57 7 ए क3 त्र 0 ए क4 त्र 2 11 0 ए

3. थवत जीम कंज बंसनसंजम जीम उमर प्रम — 1। क वित्त पदहसम उमर पदह चसंदण पद्ध चतवइंसपजल विबमचजंदबम वित्त 0 4: कममिबजपअम पद सवज पे 0 55 8 पपद्ध स्वजे प्रम छ त्र 20 ए 000 नदपजे पपद्ध दचप्र 1 5

पअद्ध कममिबजपअम विनदक पद जीम उमर तम दवज जव इम तमचसंबमकण

4. कमेबतपइम नेम विक्मअपक ठतवूद जंदहमदज बवउचंतजवत वित्त हमंत उमनतमउमदज बंसनसंजम जीम कपउमदेपवद विजीम ठेम जंदहमदज समदहजी वअमत 3 जममजीपजी उवकनसम वि 2 5 5 20 ह चमेनतम दहसम — 30 जममजीप

DEME-606

[Practical Machine Design]

Part A

1. Using the constant $k=60.8 \times 10^6$ in the Stribeck's equation, compute the static capacity of a single row deep groove ball bearing series 208 with 9 balls having a diameter of 12mm.
2. What is infinitely long and short journal bearing? State conditions and write Reynold's equation for long and short journal bearing.
3. A worm gear box with an effective surface area of 1.5 m^2 is operating in still air with a heat transfer coefficient of $15 \text{ W/m}^2\text{°C}$. The temperature rise of lubricant is limited to 60° C . The worm gears are designated as 1/30/10/8. The worm shaft is rotating at 1440rpm and the normal pressure angle is 20° . Calculate the power rating based on thermal consideration for the drive.
4. A stepped shaft is subjected to a uniform torque of 200 N-m and a completely reversed bending moment of 500 N-m at the step. The shaft is made of cold drawn steel with ultimate tensile strength of 650 N/mm^2 and yield strength of 380 N/mm^2 . The theoretical stress concentration factor for bending and torsion are 2 and 1.6 respectively. Notch sensitivity = 0.96 Size factor = 0.85 Reliability factor = 0.865 Surface finish factor = 0.9 If the factor of safety is 1.5, determine the diameter of the shaft corresponding to the expected life of 15000 cycles and also infinite life.
5. A cone clutch is used to transmit 28.75kw at 1440rpm. Coefficient of friction is 0.183 and allowable pressure is 0.15 N/mm^2 . Semi cone angle is 12.5° and the mean radius is twice the face width. Assuming uniform pressure conditions determine. i) Dimensions of cone. ii) Force required for engaging the clutch iii) Force required for disengaging the clutch, if any.

Part B

1. A single stage spur gear box is used to transmit 15 kW power at 1440 rpm of pinion. The desired transmission ratio is 4:1
Assume 20 degree FD involute profile and material C55Mn1 for pinion and gear.
 - i) Find the module
 - ii) Check gear for Lewis Dynamic Load
 - iii) Check gear for wear strength
 - iv) Write Constructional Details.
2. Design a Bevel gear pair for following specification,
Rated power = 25KW
Input speed = 960 rpm
Output speed = 240 rpm
Shafting intersecting angle = 75 degree.
3. Explain following terms -
 - i) Hunting tooth.
 - ii) Crowning of gear tooth.
 - iii) Leading edge of helical gear.

4th । चंपत वजितंपहीज इमअमस हंमंते पूजी 20° चतमेनतम दहसम बवदेपेजे व 20 जममजी चपदपवद उमौपदह पूजी 30 जममजी हंमंतण जेम उवकनसम पे 4उउपसम जीम बिमपूकजी पे

20उउण जीम चपदपवद — हंमंत उंजमतपंसंीं नतबिमिंतकदमे वि400 ठम्छण जीम चपदपवद
तवजंजमे ज 720तचउ दक तमबमपअमे ओ चवूमत तिवउ उवजवतण जंपदहंमतअपबम बिजवत वि
1ण5 दक ठंतजीं बिजवत वित कलदंउपब सवंकपदह कमजमतउपदम जीम बिजवत विमिजल पद चपजजपदहण