SAMPLE QUESTION PAPER

Sub: M.V

Semester: 7th (MECH)

Que.1 Define the degree of freedom of a vibration system.

Que.2 What is the difference between the free and forced vibration?

Que.3 What do you mean by logarithmic decrement?

Que.4 Describe the resonance?

Que.5 What is the difference between transient and harmonic excited vibration?

Que.6 What do you mean by principle mode of vibration?

Que.7 What is transmissibility?

Que.8 State the difference between transient and forced vibration?

Que.9 What is influence coefficients?

Que.10 What do you mean by whirling of shafts?

Que.11 Write short notes on:

(a) Vibration exciters
(b) Vibration isolation
A weight of 50N is suspended from a spring of stiffness \(4000\) N/m and is subjected to a harmonic force of amplitude 60N and frequency 6Hz. Find (i) the extension of the spring due to the suspended weight (ii) the static displacement of spring due to the maximum applied force.

Explain torsional vibration of rod and flexural vibration.

Explain multi degree of freedom system and vibration absorber.

Explain the Runge-Kutta Method?

What is critical speed and whirl of rotation shafts?

What is impulse shaft excitation Arbitrary Excitation?

Explain Rayleigh's Method and Coulomb damping?
SAMPLE QUESTION PAPER

Subject - CADD Semester - 3rd (MECH)

Q1: Explain Bezier curve. Generate a Bezier curve using the following control points:
(2,0), (4,3), (5,2), (4,-2) & (6,2).

Q2: Explain the procedure of finite element analysis by taking a suitable example from 1D thermal problem.

Q3: Give an industrial look at modern CAD/CAM.

Q4: Explain
(i) Homogeneous coordinate
(ii) Concatenation
(iii) Boundary representation
(iv) Sweep representation.

Q5: Name different scheme for representing solid object. Discuss basic elements & various building operation of constructive solid geometry (CSG) scheme with examples.

Q6: What are important output & input devices now a days used in CAD?
7. A triangle is defined in 2D ICG system by its vertices.
A (0,3)  B (0,5)  C (3,4)

a) Scale the original triangle by a factor of 2.5 by assuming (0,3) as fixed point.
b) Rotate the original triangle by 45° about the origin.

c) Discuss the parametric representation of a circle and a hyperbola.

d) Explain about Hermite cubic spline and order of continuity between the joining curve.

10. What is automation? Explain the types of automation with suitable examples.

11. What are NC systems? What are the types of NC systems.

12. What is Flexible Manufacturing system? List the FMS components, their application & benefits.

13. What is EEM? Explain the different steps of finite elements modelling. Also write down the element stiffness matrix for linear solution.
What are the basic elements of constructive solid geometry & explain how a solid is connected by applying Boolean operation on basic primitive?

Explain following:
(i) Fixed automation
(ii) Programmable automation
(iii) Flexible automation

Explain computer aided process planning. What are types of CA PP?

Explain the parametric representation of surface & write the parametric equations of ruled surface, surface of revolution, Bezier surface & B-surface.

Differentiate manual part programming & computer-assisted part programming.
Subject - D.O.M.           SEMESTER 5th (MECH.)

Q1→ The following data relate to a horizontal reciprocating engine.

Mass of reciprocating parts = 120 Kg
Crank length = 90 mm
Engine speed = 600 r.p.m.
Connecting rod:
Mass = 90 Kg
Length between centres = 450 mm
Distance of centre of mass from big end centre = 180 mm
Radius of gyration about an axis through centre of mass = 150 mm

Find the magnitude and the direction of inertia torque on the crankshaft when the crank has turned 30° from the inner-dead centre.

Q2→ Write a short note on belt transmission Dynamometer?

Q3→ In a procell governor the mass of each ball is 8 Kg and the mass of the sleeve is 120 Kg. Each arm is 180 mm long. The length of extension of flower arms to which the balls are attached is 180 mm. The distance of pivots of arms from axis of rotation.

Determine the:

i) Equilibrium speed

ii) Coefficient of insensitiveness of the friction of the mechanism is equivalent to 30 N.

iii) Range of speed when the governor is inoperative
Q 4 - What is field balancing of rotors? Explain the procedure.

Q 5 - What is the effect of the gyroscopic couple on the stability of a four wheeler while negotiating a curve?

Q 6 - Describe the function of a pivoted-cradle balancing machine with the help of a neat sketch. Show that it is possible to make only four test runs to obtain the balance masses in such a machine.

Q 7 - Write short note on the following:
   a) Stability of four wheel vehicles moving on curve path.
   b) Balancing of rotating mass in single plane
   c) Hydraulic dynamometer.

Q 8 - A flywheel of mass 10 kg and radius of gyration 300 mm is spinning about its axis, which is horizontal and is suspended at a point distant 150 mm from the plane of rotation of the flywheel. Determine the angular velocity of precession of the flywheel. The spin speed of flywheel is 900 r.p.m.

Q 9 - Explain the terms relating to governors
    i) Sensitivity
    ii) Hushing
    iii) Stability
A shaft carries four rotation masses A, B, C and D in this order along its axis. The mass A may be assumed to be concentrated at radius of 18 cm, B of 24 cm, C of 12 cm and D of 15 cm. The masses of B, C and D are 30 Kg, 50 Kg, and 40 Kg respectively. The planes containing B and C are 30 cm apart. The angular spacing of the planes containing C and D are 90° and 210° respectively relative to B measured in the same plane. If the shaft and masses are to be in complete dynamic balance, find:

1) The mass and the angular position of mass A
2) The position of planes A and D.

Q11-3 Explain the following terms with required expression.
   1) Variation of tractive force.
   11) Swinging couple.
   111) Hammer Blow.

Q12-9 Write short notes on any two:
   a) Rope brake absorption dynamometer
   b) Perny Brake dynamometer.
   c) Piston effort.

Q13-9 Each paddle wheel of a steamer have a mass of 1600 Kg and radius of gyration of 1.2 m. Find the magnitude of the gyroscopic couple acting on the steamer.
Four masses A, B, C and D are completely balanced. Masses C and D make angle of 90° and 195° respectively with the rest of mass B in the clockwise direction. The rotation masses have the following properties:

\[ m_b = 25 \text{ Kg}, \quad r_a = 150 \text{ mm} \]
\[ m_c = 40 \text{ Kg}, \quad r_b = 200 \text{ mm} \]
\[ m_d = 35 \text{ Kg}, \quad r_c = 100 \text{ mm} \]
\[ r_d = 180 \text{ mm} \]

Plane B and C are 250 mm apart. Determine

i) Mass A and its angular position with rest of mass B.

ii) Positions of all the planes relative to plane of mass A.

Describe the graphical method of considering the inertia of the connecting rod of a reciprocating engine.

Q.1. What are the desirable properties of air conditioning system?

Q.2. What are the performance factors?

Q.3. 300 m³ of air is supplied per minute. Conditions of 40°C dry bulb temp. and dew point temp. of an air conditioned room. The air is first by a cooling coil having by pass factor and dew point temp. 15°C and then by a chemical dehumidifier. Air leaves the chemical dehumidifier at dry bulb temp. 30°C dry bulb temp. Air is then passed over a cooling coil whose surface temp. is 15°C and by pass factor of 0.26. Calculate the capacities of the two cooling coils and dehumidifier.

Q.4. Write notes on:
(a) Forced draft cooling tower.
(b) Flooded evaporator.
(c) Rotary Compressors.

Q.5. Explain in detail simply vapour absorption system with block diagram?

Q.6. Write short notes on:
(i) DBT, WBT, Drynus fraction.
(ii) Types of Refrigerant.
(iii) Reciprocating Compressor and Condenser.
1. What are the desirable properties of an ideal refrigerant?

2. What are the performance factors of Bell-Coleman cycle of refrigeration system given by COP = \( T_2 \frac{(T_3 - T_2)}{T_1} \)?

3. 300 m\(^3\) of air is supplied per minute from outdoor conditions of 40°C dry bulb temp. and 26°C wet bulb temp. of an air conditioned room. The air is dehumidified first by a cooling coil having bypass factor of 0.3 and dew point temp. 15°C and then by a chemical dehumidifier. Air leaves the chemical dehumidifier at 30°C dry bulb temp. Air is then passed over a cooling coil whose surface temp. is 15°C and by bypass factor of 0.26. Calculate the capacities of the two cooling coils and dehumidifier.

4. Write notes on:
   (a) Forced draft cooling tower.
   (b) Flooded evaporator.
   (c) Rotary compressors.

5. Explain in detail simply vapour absorption system with block diagram?

6. Write short notes on:
   (i) DBT, WBT, Dryness fraction.
   (ii) Types of Refrigerant.
   (iii) Reciprocating Compressor and Condenser.
7. Mention the function of each fluid in a three-fluid vapour absorption system.

8. What are the different methods used to remove the odours from the air?

9. With the help of a neat diagram, explain the function of dry and wet filters.

10. Explain the following with neat diagram?
   (a) Shell and coil condenser.
   (b) Thermostatic expansion valve.
   (c) Winter and summer air conditioning.

   (i) Specific humidity.
   (ii) Relative humidity.
   (iii) Dew-point temp.
   (iv) Enthalpy of mixture.
   (v) Specific volume of mixture.

12. A refrigerator working on Bell-Coleman cycle operates between pressure limits of 1.03 bar and 9.0 bar. Air is drawn from the cold chamber at 10°C. Air coming out of compressor is cooled to 30°C before entering the exp. cylinder. Exp. and compressor follow the law pv^0.35 = Constant. Determine the theoretical COP of the system and work done by the compressor.
13. What are the different types of compressors mentioned in the field for the use of each in refrigeration system giving reasons?

14. What are the advantages and disadvantages of steam jet refrigeration system over other types of refrigeration system?

15. State and describe different properties of the refrigerants?

16. Explain the CO2 Refrigeration system with a neat diagram?

17. A hall is to be maintained at 20°C and 60% RH, when the outdoor air Conditions are 40°C DBT and 26°C WBT. The Sensible heat load of the hall is 70,000 kJ/hr and the latent heat load is 20,000 kJ/hr. The infiltrated air 30ms/min. 60% of the total air required is recirculated and mixed with the Conditioned air after the Conditions.

Find the following:
(i) The Condition of air leaving the Conditioner and before entering the hall.
(ii) Volume of fresh air passing through air Conditioner.
(iii) By-pass factor of the Cooling Coil.
0. No. 1) Drive an expression for maximum efficiency for jet propulsion when the inlet orifices are at right angles to the direction of the motion of the ship.

0. No. 2) Drive an expression for maximum hydraulic efficiency for a Pelton turbine.

0. No. 3) Discuss cavitation and its causes. Also explain its harmful effects and method to prevent it.

0. No. 4) Write the short note on the following
   a) Hydraulic intensifier
   b) Hydraulic ram
   c) Hydraulic press.
   d) Hydraulic lift

0. No. 5) Show that the efficiency of free jet striking normally as series of flat plates mounted the periphery of a wheel never exceed 50%.

0. No. 6) A jet of water moving at a velocity of 30 m/s impinges on a series of vane moving at 15 m/s.
the jet makes an angle of 30° to the direction of motion of vanes at entry and leave the vane at 120°. Draw the velocity triangle and find:
i) Vane angle at inlet and outlet.
ii) Work done per second per N of water.
iii) The efficiency.

Q. No. 7) Discuss the different types of head and efficiency of hydraulic turbines.

Q. No. 8) Explain unit speed, unit discharge and unit power of a hydraulic turbine. Derive expression for each of them.

Q. No. 9) A Francis turbine having a diameter of 2.92 m operates at 163.5 rpm under 45 m head and develops 19900 kW at an efficiency 87%. Find other characteristic if this turbine operates under 60 m head.

Q. No. 10) A propeller turbine has a 6 m diameter runner and 1.8 m boss and consumes 0.20 m/s of water. If the flow ratio is 0.4, the guide blade angle is 5° and hydraulic efficiency is 90%. Calculate the speed of the turbine and the head of the turbine assume that turbine discharge is without whirl.
(No. 11) A four stage centrifugal pump has impeller 380 mm diameter 19 mm wide at outlet. The outlet vane angle is 45° and vane duty occupy 8% of the outlet area. The manometric efficiency is 84% and overall efficiency 72%. Determine the head generated by the pump when running at 900 rpm and discharging 59 lit/sec. Also determine the power required to drive the pump.

(No. 12) A hydraulic press has a ram of 165 mm diameter and plungers of 33 mm diameter with stroke length of 250 mm. Weight exerted by press ram amounts at 5.5 KN and distance moved is 1.2 m in 20 minutes.

i) The force applied on plunger.
ii) Number of stroke performed by the plunger.
iii) Work done by the press ram.
iv) Power required to drive the plunger.

(No. 13) Why the draft tube necessary in case of reaction turbine? Also discuss the main types of draft tubes.

(No. 14) The discharge Q over a weir depends on the head of water H, the acceleration due to gravity g, the density \( \rho \), the viscosity \( \mu \) and the surface tension \( \gamma \). Obtain an expression for the discharge.
Q. No. 15) Describe with the aid of neat sketch the construction and working of a hydraulic ram.

Q. No. 16) Describe with the aid of neat sketch the construction and working of a torque converter.

Q. No. 17) A Kaplan turbine working under a head of 5 m develops 16000 kW shaft power. The outer diameter of runner is 4 m and hub diameter is 0.8 m. The guide blade angle is 35°. The hydraulic and overall efficiency are 90% and 85% respectively. If velocity of whirl is zero at outlet, determine runner vane angle at inlet and outlet and speed of turbine.

Q. No. 18) What is draft tube? Why is it used in a reaction turbine? Describe with sketches two different types of draft tube.
0.1 Write short notes on following.
1) Reversible and Irreversible process
2) Throttling Process
3) PM MSK
4) Compressibility factor
5) Carnot cycle
6) Work
7) Energy
8) Power

0.2 "First law of thermodynamics" Explain it?

0.3 Explain the second law of thermodynamics? Define Kelvin-
Planck statement, and their equivalence.

0.4 Explain the Carnot theorem?

An inventor claims to have developed an engine that operates
between a source at 450 K and a sink of 280 K, and is
Capable of 0.15 kWh of work for every 1200 kJ of heat received.
As a patient of physics, would you issue a patent for such an
engine.

0.5 Explain Steam or Gas turbine? OR
Explain the construction and working of separating and Throttling
Calorimeter

0.6 Explain Steady flow energy equation (SFEE)? Derive steady
flow energy equation for first law.
Explain the "Temperature-Entropy" PLOT? Entropy a point function. Prove it.

Define "Carnot cycle" and "Dual Combustion Cycle"?

In a Carnot cycle, heat is supplied at 625 K and is rejected at 300 K. The working fluid is water which while receiving heat evaporates from liquid at 625 K to steam at 625 K. From the steam tables, the entropy change for this process is 1.4374 kJ/kgK. If the cycle is operated with kg mass of water, find the heat supplied, work done and heat rejected per cycle. What is the pressure of water during heat reception.


Derive an Expression for Diesel cycle, Dual cycle and Otto cycle.

Derive an Expression for reduced van der walls equation of state?

Define Helm-Holtz and Gibbs function?

Establish the inequality of de Clausius?

What is a heat pump? How does it differ from a refrigerator and heat engine.
Short Note: Sub-Environmental Pollution and Control

1) Public health sanitation of dwelling houses.
2) Preaudit activity and past audit activity.
3) Sensitive analysis and risk management.
4) Economics of environment.

Q.No.6) What is air pollution? Discuss the various effects of air pollution on environment and diseases of air pollution.

Q.No.4) Principle of villages and town planning.

Q.No.5) What is water pollution? Discuss the various effects of water pollution on environment and diseases of water pollution.

Q.No.6) What is land pollution? Discuss the various effects of land pollution on environment and diseases of land pollution.

Q.No.7) What are the environmental ventilation and illumination? And what are its importance?

Q.No.8) What are environmental auditing process? Different type of auditing process.
No. 9) What do you mean by sampling device? How mathematical modeling are useful for evaluation of environmental parameters?

No. 10) Explain the application of sample and (design) device for the design of hospital and public buildings.

No. 11) What do you mean by environmental management system, technique, standard?
Q1. (a) What do you mean by strain energy?
(b) What assumptions are in theory of thin cylinders and shells?
(c) Why wire winding of thin cylinders is done?
(d) What do you mean by product of inertia?
(e) What is the difference between leaf springs and concentric springs?

Q2. (a) Give the statement of Castigliano's theorem.
(b) What are the bunition or spoke?
(c) Give example of product of inertia.
(d) Explain Mohr's theory.
(e) Write the lamé's equation for a thick cylinder shells.

38. (a) Write the statement of Maxwell's theorem.
(b) Define the bending moment.
(c) Define stress and strain.
(d) Define shear force.
(e) Write the maximum principal strain theory for ductile material.
9.4 A load of 1000 N falls through a height of 20 m on to a collar rigidly attached to the lower end of a vertical bar 1.5 m long and of 1.5 cm² cross-sectional area. The upper end of the vertical bar is fixed. Determine:

(i) Maximum instantaneous stress induced in the vertical bar.
(ii) Maximum instantaneous elongation
(iii) Strain energy stored in the vertical rod.

Take \( E = 2 \times 10^5 \) N/mm².

Q5. Explain various theory of failure bar:

(i) Ductile materials.
(ii) Brittle materials.

Q6(a) Show that in thin cylinders, shell subjected to internal fluid pressure, the circumferential stress is twice the longitudinal stress.

(b) A cylinder of internal diameter 12.5 m contains a fluid at an internal pressure of 24 N/mm². Determine the maximum thickness of the cylinder if:

(i) The longitudinal stress is not to exceed 30 N/mm².
(ii) The circumferential stress is not to exceed 45 N/mm².
97 Three beams have the same length, same allowable bending stress and the same bending moment. The cross-section of the beams are a Square, rectangular with depth twice the width and a Circle. Find the ratio of weights of the circular and the rectangular beams with respect to square beams.

98 A compound cylinder is made by shrinking a tube of external diameter 300 mm and internal diameter 250 mm over another cylinder of external 250 mm and internal diameter 200 mm. The radial pressure at the junction after shrinking is 500 N/mm². Find the final stresses set up across the section when the compound cylinder is subjected to an internal fluid pressure of 80.5 atm/mm².

99 Prove that in case of a rotating hollow cylinder, the radial stress is maximum at radius \( R = \sqrt{r_1 r_2} \) and is given by:

\[
(6\pi)_{\text{max}} = \frac{7 \pi \alpha^2}{8} \left( \frac{r_1 - 2\mu}{1-\mu} \right) \left( r_2 - r_1 \right)^2
\]

10 Find the expression for bending stress produced in the curved beam which is subjected to bending moment.
All prove that the deflection of a close-coiled helical spring at the centre due to axial load \( W \) is given by:

\[
\delta = \frac{64 \cdot W \cdot R^3}{E \cdot d^4}
\]

Where:
- \( R \) = Mean Radius of spring coil.
- \( n \) = Number of coils.
- \( E \) = Modulus of rigidity.
- \( d \) = Diameter of spring wire.

Q.12. Find the expression for strain energy stored in body when subjected to shear stress.

Q.13. Derive Lamé's Equation for a thick cylinder shell subjected to internal pressure, with neat sketch.

Q.14. Find the expression for central deflection of leaf spring when subjected to load \( W \).

Q.15. Explain in detail the procedure for binding stress in case of circular closed ring when subjected to tensile load.
Subject - O.R.

(iii) Define operation research.

(iv) What is the example of probabilistic models?

(v) Define PERT.

(vi) What are the advantages & limitations of L.P.

(vii) Define ISD probit and ISO cost lines.

(viii) What is duality.

(ix) Write the role of operations research in decision making.

(x) Differentiate between deterministic & stochastic simulation models.

(xi) Explain the methods of Monte Carlo simulations.

(xii) What is simulation?

(xiii) What is the role of decision making.

(xiv) Explain with examples the various classification scheme of O.R. models.
Q5. Solve the following LPP by simplex method.

Maximize:

\[ Z = 2x_1 + 2x_2 + 3x_3 - x_4 \]

Subjected to the constraints

\[ x_1 + 2x_2 + 3x_3 = 15 \]
\[ 2x_1 + x_2 + 5x_3 \geq 20 \]
\[ x_1 + 2x_2 + x_3 + x_4 = 10 \]
\[ x_1, x_2, x_3, x_4 \geq 0. \]

Q6. A manufacturing company has been three factories F1, F2 and F3 with monthly manufacturing capacities of 7,000, 4,000, and 10,000 units of a product. The product is to be supplied to seven stores. The factory capacities, stores equipments and unit cost (in rupees) of shipping from each factory to each store are given in table.

<table>
<thead>
<tr>
<th></th>
<th>Store 1</th>
<th>Store 2</th>
<th>Store 3</th>
<th>Store 4</th>
<th>Store 5</th>
<th>Store 6</th>
<th>Store 7</th>
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<td>3</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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</tr>
<tr>
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<td>2</td>
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<td>5</td>
<td>1</td>
<td>3</td>
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<td>2</td>
<td>8</td>
<td>4</td>
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</table>

Factory capacity 7,000, 4,000, 10,000

Find the optimal transportation plan to minimize the total transportation cost.
a skilled worker Rs. 14 per hour and that a
room attendant Rs. 0.75 per hour.
A7. Discuss about simulation applications.
A8. Write short note on:
   (i) Decision-making under risk and uncertainties.
   (ii) SIMON model.
A9. Use the graphical method to solve the
    following LPP problem:
    
    minimize \( z = 20x_1 + 10x_2 \)
    subjected to the constraints:
    
    \( x_1 + 2x_2 \leq 100 \)
    \( 3x_1 + x_2 \geq 30 \)
    \( x_1 + 3x_2 \geq 60 \)
    \( x_1, x_2 \geq 0 \).
A10. Define decision. Explain the following principles
     of decision making:
        (i) Laplace
        (ii) Maximum
        (iii) Hurwicz.
A11. Solve the LPP by dual-simplex method:
    
    maximize \(-2x_1 - 2x_2 - 4x_3\)
    subjected to
    
    \( 2x_1 + x_2 + 5x_3 \geq 2 \)
    \( 3x_1 + x_2 + 7x_3 \geq 3 \)
    \( x_1 + x_2 + 5x_3 \geq 0 \).
Q12. Find the optimal solution of the problem:

minimize \( Z = x_1 - 2x_2 - x_3 \)

subject to \( x_1 + 2x_2 + x_3 \leq 6 \)
\( x_1 - 2x_2 \leq 4 \)
\( x_1, x_2 \geq 0 \).

If a new constraint \(-x_1 + 2x_2 \geq 4\) is added to the problem, find the new optimal solutions.

Q13. Workers come to tool store room to receive special tools (required by them) for accomplishing a particular project assigned to them. The average time between two arrivals is 60 seconds and the arrivals are assumed to be in poisson distribution. The average service time (of the tool room attendant) is 120 seconds. Determine:

(i) Average queue length.
(ii) Average length of non-empty queues.
(iii) Average number of workers in system including the worker being attended.
(iv) Mean waiting time of an arrival.
(v) Average waiting time of an arrival (worker) who waits.
(vi) Determine whether to go in for an additional tool store room attendant which will minimize the combined cost of attendant's idle time and cost of workers waiting time. Assume the charges of
Q.14. Solve the initial feasible solution to the transportation problems by the method of NWCR. The following table gives transportation time (in hours) from factories to warehouses:

<table>
<thead>
<tr>
<th></th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>Total</th>
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<td>40</td>
<td>20</td>
<td>40</td>
<td>35</td>
<td>32</td>
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</tbody>
</table>

Q.15. Assuming Poisson arrival rate and exponential service time for M/M/1 system, the mean arrival rate is 8 per hour and the mean service time is 6 minutes. Determine:
(a) Probability that the system is busy.
(b) Average time spent by customer in queue.
(c) Average length of the queue.
(d) Average no. of customers in the system.
Qus. 1. What is the use of basic earth sun angle. Explain with neat and clean diagram.

Qus. 2. Sun as a source of energy. Justify the statement with relevant data.

Qus. 3. What is solar collector and classify them.

Qus. 4. Comparison b/w Concentrating and flat plate collector.

Qus. 5. Different method used for stored solar energy.

Qus. 6. Explain the different type of solar pond.

Qus. 7. Explain with neat and clean diagram the construction, working and principle of vapour absorption system for cooling application.

Qus. 8. What is passive cooling system.

Qus. 9. What is solar cell power generation gives its advantages and disadvantages.

Qus. 10. What is the material used in solar cell.
Qns 11) Write short note on global warming.

Qns 12) Explain green house effect.

Qns 13) Ozone layer depletion.

Qns 14) Principal of solar cooker. Construction and working.

Qns 15) Steady state heat transmission. Explain.
Subject: Power Plant

Q1: Write short note on Thermo-electric Power Generation.

Q2: Write short note on Thermionic Power Generation.

Q3: Write short note on Wind Power Plant.

Q4: Write short note on Geothermal Power Plant.

Q5: Write short note on Tidal Power Plant.


Q7: Explain the principle of PWR, BWR, and CANDU.

Q8: What is Power Plant Economics? Explain the tariffs and methods of electrical energy.
Q9.7 Explain the performance and operating characteristics of power plant.

Q10.7 Write short note on PFBC system.

Q11.7 Explain the parameters affecting thermodynamic efficiency of combined cycles.

Q12.7 What is steam power plants? Explain in detail the flow sheet and working of modern thermal power plant.

Q13.7 Write short note on rainfall and run-off measurement.

Q14.7 Write short note on site selection.

Q15.7 What are the different types of power plant? Explain in detail.

Q16.7 Explain in detail the observation of the different component of hydro-electric power plants.
Important Question ME 5th Sem

Subject - MANUFACTURING TECH. -III

Q1. What is meant by built-up edge (BUE)? With a neat sketch explain the formation of a BUE. Explain the conditions which promote the growth of BUE along with its consequence.

Q2. Which are the suitable tool failure criteria that are generally practiced in industries? Explain your answers with an example.

Q3. What are the various methods available for measuring cutting tool temperature? Explain their applications and disadvantages.

Q4. A single point cutting tool has a zero rake angle and a 2° clearance angle. By what percentage would the life of the tool be increased if a clearance angle of 8° was provided? State any assumptions made.

Q5. Explain the application of GRAPHITE as electrode material EDM.

Q6. What is the function of abrasive slurry in UBM? Explain how the abrasive selection is made.

Q7. Briefly explain the various process parameters that affect the material removal rate and surface quality in ECM.
Q11. What are the important parameters that control the material removal rate in EDM? Briefly explain about any three factors.

Q12. Explain the advantage & limitations of Numerical Control (NC) of machine tools.

Q13. How is cutter compensation given in the case of a machining centre? Explain it with the help of an example from it is operational.

Q14. Explain the concept of location. What do you understand by the 3-2-1 principle of location?

Q15. What are the principles to be considered while placing the locators in different planes of a part?

Q16. Explain briefly about the errors caused by the clamping force used in holding the workpiece.

Q17. What do you mean by Group Technology in the manufacturing philosophy? Enlist the benefits of group technology.

Q18. Explain the concept of part families in the light of Group Technology.

Q19. Write a short note on composite part concept used in Group Technology.
Important Questions MDD 5th Sem

Q.No. 1) i) What is the purpose of standardization?
   ii) Name the rivet heads used in boiler construction?
   iii) What are the purpose of machinery for which coupling are use?
   iv) What are the types of rope used in rope drive?
   v) What is the function of clutches?

Q.No. 2) i) What do you mean by strength design?
   ii) Discuss the types of brakes?
   iii) Define cotter. Why the taper is provided in a cotter.
   iv) What is the belt slip and creep?
   v) Describe the function of key?

Q.No. 3) i) Discuss the material of the rivets used in boiler.
   ii) Write the application of chain drive.
   iii) Write down the advantage of friction clutches.
   iv) In which cases the use of threaded joint is not recommended?
   v) Define cotter. Why the taper is provided in a cotter.
   vi) What do you mean by system design?
Q. No. 4) Find the diameter of cast iron pulley and thickness and width of leather belt to transmit 188.7 kW power from a shaft that is directly connected to a steam engine running at 31.4 rad/sec to a centrifugal pump with a speed ratio of 1:35.

Q. No. 5) It is required to design a chain drive to connect a 12 kW, 1400 rpm electric motor to a centrifugal pump running at 700 rpm. The service conditions involve moderate shocks.

(i) Select a proper roller chain and give a list of its dimensions.

(ii) Determine the pitch circle diameters of driving and driven sprockets.

(iii) Determine the number of chain links.

(iv) Specify the correct center distance between the axes of sprockets.

Q. No. 6) A plate clutch having a single driving plate with contact surface on each side is required to transmit 110 kW at 1250 rpm. The outer diameter of the contact surface is to be 300 mm. The coefficient of friction is 0.4.

(a) Assuming a uniform pressure of 0.17 N/mm², determine the inner diameter of the friction surfaces.
b) Assuming the same dimension and the same total axial thrust, determine the maximum torque that can be transmitted and the maximum intensity of pressure when uniform wear condition have been reached.

Q.No. 7) A differential brake has an operating lever 0.285 m long. The end of the brake band are attached so that their operating arms are 68 mm and 127 mm long. The brake drum diameter is 0.60 m, the arc of contact 300°, brake band is 3.2 mm x 100 mm and the coefficient of friction is 0.22.

a) Find the least force required at the end of the operating lever to subject this band to a stress of 55 MPa.

b) What is the torsional moment applied to the brake drum shaft.

c) Is this brake self locking? Prove your answer.

Q.No. 8) What do you understand by stress concentration? Explain stress concentration factor.

b) What are various types of fits? Explain them with the help of neat diagrams.
0. No. 9) Design a double riveted butt joint with two cover plates for the longitudinal steam of boiler shell. 0.75 aluminum to carry a maximum steam pressure of 1.05 N/mm². The allowable stress are: \( f_t = 35 \text{ N/mm}^2 \), \( f_s = 28 \text{ N/mm}^2 \). Assume the efficiency of the joint 75%.

0. No. 10) A 150 x 100 x 12.5 mm angle is welded to a steel plate by fillet weld along the edge of the 150 mm leg. The angle is subjected to a tension load of 300 kN. Determine the lengths of the welds required if the load is applied with heavy shock.

0. No. 11) Determine the size of a wire rope necessary for a nine hoist carrying a load of 69.50 kN to be lifted from a depth of 32.5 meters. A rope speed of 7.9 m/s is to be attained in 10 seconds.

0. No. 12) A cone clutched faced with leather is to transmit 15 kW at 1000 rev/min. The cone angle is 25° the mean radius is 0.165 m, the coefficient is 0.20 and the friction surface is 75 mm wide.

i) the axial force required in the spring.

ii) The normal pressure at the friction surface.
Q. No. 13) A multidisc clutch consists of steel and bronze plates. It transmits 15 kW at 1260 rpm. The inner and outer diameters of contacting are 75 mm and 150 mm respectively. The coefficient of friction is 0.14 and the permissible intensity of pressure is 0.5 N/mm². Calculate the number of steel and bronze disc.

Q. No. 14) Design a cast iron flywheel for a four-stroke IC Engine developing 800 kW at 2400 rpm. The hoop stress developed in the rim is 5 MPa. The total fluctuation of speed is to be limited to 2.5% of mean speed. The work done during the power stroke is on the shaft is twice the mean torque. The density of the cast iron is 7200 kg/m³.

Q. No. 15) A V belt drive is to transmit 15 kW to a compressor. The motor speed is 1200 rpm and the compressor pulley runs 400 rpm. Give complete design of the drive.

Q. No. 16) Design and draw a knuckle joint to transmit a tensile load of 32 kN.
(Q. No. 17) A bracket is supported by means of four rivets of same size as shown in Fig. Determine the diameter of the rivets of the maximum allowable shear stress is 100 MN/mm².

(Q. No. 18) Design and draw a cotter joint subjected to slow reversal of 30 kN load clearly state the design decision taken.