Model Question

Eighth semester B.Tech. Degree Examination

(2008 scheme)

Branch: MECHANICAL

08.801: Energy Conversion and Management

Time: 3 Hours Max. Marks 100

Instruction : Answer all questions in Part-A and one question from each Module in Part-B

## PART-A

!.What is meant by cogeneration?

2. What are advantages of Fuel cells over thermal power plant?

3. What are the computer applications in energy management?

4. Briefly explain the various energy storage systems.

5.Write short note on peak load power plants.

6.What are the objectives of energy management?

7. What is meant by distributed generation? What are the various modes?

8.Wich are main factors affecting the performance of biogas plant?

9. What is meant by enrichment of uranium?

10. Which are the various means by which the efficiency of the thermal power plant can be improved?

## PART-B

### Module – I

11. a. Explain the working of a boiling water reactor.

    b. Write short note on compressed air storage as a means of energy storage.

12. a. write short note on load curves.

    b. What do you mean by energy farming?

## Module – II

13. a. What are the essential functions of energy management?

    b. What are the basic steps in energy management?

14. a. Briefly explain on supply side and demand side energy management

    b. Write short note on intermediate energy auditing.

## Module – III

15. a. What is meant by energy conservation?

    b. Briefly explain a diesel engine based cogeneration system.

16. a. What are the various ECO's in a process industry?

    b. Write short note on regenerators.

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# Model question paper

## Eighth Semester B.Tech. Degree examination April/May 2012

### 08.802 INDUSTRIAL ENGINEERING (MPU)

(2008 Scheme)

Time: 3hrs Maximum: 100 Marks

Part-A

Answer all questions

1. Differentiate Preventive and Breakdown Maintenace?
2. Define Group Technology? State its advantages?
3. State the Principles of Material handling?
4. What is PMTS&MTM?
5. Differentiate Job evaluation and Merit rating?
6. What is Fatigue?How to prevent Fatigue?
7. Describe Features of Workers participation in Management?
8. What is EOQ?What is value Engineering?
9. What is the use of Bath Tub Curve?
10. What is Depriciation?Name the methods on which depreciation is found?

Part-B(Answer AnyOne From Each Module)

Module-I

11. Define Industrial Engineering? Describe the Evolution?
12. What is Productivity? Elabrate Product Development and Reseach?

Module -II

13. Explain in detail the essentials of a good wage incentive plan? Describe any one wage Plan

14. Describe the effect of Communication and Scope of Trade Union in industry?

Module-III

15 . Describe the functions of PPC? What is inventory control?

16. Write Short notes on the following

i. TQM

ii .Quality circles

iii .Bench marking

iv .Six Sigma

v Reliability.

# MODEL QUESTION PAPER

## EIGHTH SEMESTER B.TECH DEGREE EXAMINATION

### 08.803 AUTOMOBILE ENGINEERING(M)

**Time:3 Hrs** **Max.marks:100**

**Instructions:**Each question in part A carries 4 marks.Answer all questions from part A .Each question in part B carries 20 marks.Answer any one question from each module in part B.

## PART A

1.Classify various automobiles.

2.Describe the working of carburetor.

3.What is variable valve timing?

4.Briefly describe thermo siphon system.

5.Give the constructional details of single plate dry clutch.

6.Explain the working of torque converter.

7.What is hypoid drive?

8.What is castor angle and camber angle?

9.Enlist various types of suspension systems.

10.What are hybrid vehicles? **(10X4=40 marks)**

## PART B

### MODULE I

11.a)Describe various types of power units. **(10 marks)**

b)Discuss constructional details of reciprocating power unit. **(10 marks)**

12.a)Differentiate between MPFI and CRDI systems. **(10 marks)**

b)Describe Bendix drive. **(10 marks)**

## MODULE II

13.a) Explain the working of automatic clutch. **(10 marks)**

b)Describe the working of fluid coupling. **(10 marks)**

14.a)Explain the working of differential unit. **(10 marks)**

b)Describe the working of epicyclic gear box. **(10 marks)**

## MODULE III

15.a)Explain the working of pneumatic braking system. **(10 marks)**

b)Describe various elements of steering system. **(10 marks)**

16.a)Describe the construction of chassis. **(10 marks)**

b)Explain automotive air conditioning system. **(10 marks)**

Model Question

Eighth semester B.Tech. Degree Examination

(2008 scheme)

Branch: MECHANICAL

08.804: Computer Integrated Manufacturing (MU)

Time: 3 Hours Max. Marks 100

Instruction : Answer all questions in Part-A and one question from each Module in Part-B

## PART-A

1.Discuss the benefits of computer Integrated Manufacturing?

2. What is a data base? Why is it necessary in a manufacturing industry?

3. Explain how a CAD system operates?

4. Differentiate between CNC and DNC machines.

5.What are stepper motors?

6.Explain the terms stick slip and back lash.

7. What is the need of a feedback device?

8. Describe the use of an AGV.

9. What is concurrent Engineering?

10. Explain expert systems for manufacturing ?

(10×4=40 marks)

## PART-B

### Module – I

11. a. Explain the features of two types of CAPP system.

    b. Draw the block diagram for CIM data base .

12. a. Explain the role of host computer in a CIM.

    b. Explain the basic concepts and requirement of data base technology.

## Module – II

13. a. Differentiate between point to point, straight cut and continuous path type NC machines .

    b. What are the advantages of computer aided NC programming?

14. a. What are the different type of optical encoders? Explain with detailed diagrams.

    b. Give the comparison of open loop and closed loop control in NC system.

## Module – III

15. a. What are different types of robotic actuators?

    b. Why is a flexible manufacturing system capable of producing a wide range of lot sizes?

16. Write short notes on?

a. JIT

b. AS/RS

c. Computer Vision

(3×20=60 marks)

**EIGHTH SEMESTER B.TECH DEGREE EXAMINATION**
**Model question paper**
**2008 Scheme**

08:805 **Elective IV AEROSPACE ENGINEERING** (M)

Time : Three Hours Maximum : 100 Marks

*Answer all questions in Part A, which is compulsory each carries 4 marks*

**Part A**

1. Describe the characteristics of troposphere.
2. Explain the limitations of dimensional analysis.
3. Explain the desirable features of an ideal aerofoil.
4. Explain the term "Escape Velocity".
5. Distinguish between service ceiling and absolute ceiling.
6. Define Range and Endurance of an air plane.
7. Distinguish between Skin friction drag, form drag and induced drag.
8. What is meant by wind tunnel balance.
9. Distinguish between Momentum theory and blade element theory of propellers.
10. Define (a) Take-off distance (b) Take-off ground run (c) Landing distance (d) Landing ground run

(10 x 4=40)

**Part B**

*Answer three questions in Part B, choosing one question from each Module. Each question carries 20 marks.*

Module I

11. (a) Derive an expression for the determination of pressure and temperature in troposphere (8)
    (b) Distinguish between compressible and incompressible flow. Discuss the phenomenon of supersonic flow? (7)
    (c) Derive an expression for the velocity of sound in a perfect gas. (5)

*Or*

12. a) Derive Kutta – Joukowski equation for lift? (8)
    b) Obtain an expression for induced drag coefficient from momentum considerations. (7)
    c) How are aerofoils designated in NACA 4 digit system? (5)

## Module II

13. a) What is the condition for flattest gliding? Derive an expression for the flattest gliding? (8)

b) An aircraft weighing 20,000N requires 1840 KW for level flight at 180km/hr. The maximum power that can be developed is limited to 3680kw. Calculate the rate of climb and angle of climb at this speed? (7)

c) Show the maximum velocity attainable by jet and propeller aircraft in power required and power available graph? (5)

*Or*

14. a) Derive the condition for minimum drag and minimum power in straight and level flight of an aircraft. Find also the ratio of speed corresponding to minimum power condition to the minimum drag speed. (10)

b) An aircraft weighing 250000 N has a wing area of $80m^2$, and its drag equation is $C_d = 0.016 + 0.04 C_L^2$ .Calculate the minimum thrust required for straight and level flight, and the corresponding true airspeeds at sea level and at 10000 ($\sqrt{\sigma} = 0.58$). Calculate also the minimum power required and true airspeeds at the above altitude and compare this with the power corresponds to minimum drag. (10)

## Module III

15. (a) Explain the working of an altimeter. (7)
(b) Discuss the longitudinal, lateral and directional control of aircrafts? ( 6)
(c)What is meant by mass balance of control surfaces? (7)

*Or*

16. (a) Explain the working principle of an open circuit continuous supersonic wind tunnel. ( 10)
(b) Derive an expression for orbiting velocity assuming circular orbit and neglecting air resistance. (6)
(c) Write short notes on space travel. (4)

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Reg. No.....

Name.....

BTECH MODEL 2012

S8 M

08.805: DESIGN OF PRESSURE VESSELS & PIPING

( Elective-IV )

(2008 SCHEME)

Time: Three Hours Max. Marks: 100

Answer all questions from part A

1) With neat sketches explain the different types of supports used in pressure vessel

2)What are the methods to prevent local buckling in elliptical heads?

3) Which procedure is used in production of gun barrels? Why?

4) What is the dilation of pressure vessel? Derive an equation for the dilation of spherical pressure vessel

5)Explain the term s gust response factor and importance factor?

6) Explain the stress condition at the windward side and leeward side of a pressure vessel

7) Explain the term factor A and factor B in external pressure design?

8) Different types of pressures used in pressure vessel design and analysis

9) Explain why the half cone angle of conical cover is limited to $30^{o}$

10) Explain the term SIF factor

10x4=40

PART B

Module 1

11) a ) Derive a relation for the membrane stresses in vessels under internal pressure (10)

b) Write the ASME pressure vessel design sections? (10)

OR

12 ) Find a solution for the hoop stress in a torus and draw the stress distribution. Discuss about the failure of a torus using the above results (20)

MODULE B

13) a)Derive the ASME equation to find the moment of inertia of a circumferential stiffener? (10)

b) Explain allowable stress range and displacement stress range (10)

OR

14)Examine the data given below of a fully radiographed shell to check the compensation requirement. OD of shell 2m, maximum working of pressure 3.5MN/$m^2$, wall thickness of shell 0.05m, corrosion allowance $3x1^{-3}$m, allowable stress 96MN/$m^2$, OD of nozzle 0.25m, nozzle wall thickness 0.016m, length of nozzle above surface 0.1m. No extension inside.

MODULE C

15)A compound cylinder made of two tubes has the inner diameter of inner tube as 100mm with a thickness of 25mm. The outer tube outer diameter is 200mm and thickness 25mm. If the pressure at the interface is 12N/$mm^2$ and the fluid pressure is 8N/$mm^2$, find the hoop stress distribution in the cylinders?

OR

16)An annular ring is subjected to an external pressure at two diametrically opposite points. Derive an expression and reduce it to its simplest form for the hoop stress, radial stress and shear stress at the inside and outside surface?

# Model question paper

## Eighth Semester B.Tech. Degree examination April/May 2012

**Elective-IV**

**2008-805.13 Cryogenic Engineering (MNP)**

**(2008 Scheme)**

**Time: 3hrs** **Maximum: 100 Marks**

**Use of Thermodynamic charts and table permitted**

**Part-A**

**Answer all questions**

(10X4=40 Marks)

1. Explain Meissner effect
2. Name the scientists who are associated with the liquefactions of the following gases: Hydrogen (b) Helium
3. Explain super fluidity
4. Draw the T-S diagram for Linde dual pressure system
5. Define isothermal efficiency and mechanical efficiency of an expander
6. What are the liquefaction systems for Neon and Helium
7. Name four different applications of liquid Oxygen
8. Distinguish between Ortho and Para hydrogen
9. Briefly describe Cryopumping
10. Name a few heat exchangers used in Cryogenic systems

Part B

Answer any one question from each module

Each question carries 20 marks

Module I

11. Give an account of the historical development of Cryogenics (20 marks)

Or

12. Describe the application of Cryogenics in the fields of medicine and space technology (20 marks)

Module II

13. (a) Determine the ideal work requirement for the liquefaction of Hydrogen beginning at 101.3kPa and 300K. Also determine the heat rejected per unit mass in the ideal isothermal compressor (10 marks)

(b)Explain the Claude system for liquefaction of hydrogen (10 marks)

Or

14. Determine the liquid yield, the amount of nitrogen boiled away per unit mass of Hydrogen liquefied, and the work requirement per unit mass of hydrogen liquefied for a precooled Linde-Hampson system operating from 101.3 kPa and 300K to 5.066MPa. The Nitrogen bath is at a temperature of 70K, corresponding to a saturation pressure of 38.5kPa. (20 marks)

Module III

15. With neat sketches explain the working of Carnot refrigerator and derive its COP (20 marks)

Or

16. (a)With the help of neat sketch explain a Dewar vessel (12 marks)

(b)With neat sketches explain the working of Thermodynamic liquid-level gauge (8marks)

**Model Question Paper**

Elective-V 08.806.3 Industrial Quality Control

S8 M

Max marks:100

Time:3 hrs

**Part A**

**Answer all the questions**

1) Explain about process capability
2) Distinguish between assignable cause and chance cause of variation
3) Distinguish between attributes and variables
4) What is meant by an operating characteristic curve? Explain
5) Distinguish between AQL and LTPD
6) Distinguish between MTTF and MTBF
7) What is meant by Product Life Cycle? Explain
8) Explain about Pareto Analysis
9) What is a Bath tub curve? Explain
10) Explain about maintainability and availability (10x4=40 marks)

**Part B**

**Answer any one question from each module**

**ModuleI**

1) A subgroup of 5 items each are taken from a manufacturing process at a regular interval. A certain quality characteristic is measured and X bar and R values computed. After 25 subgroups it is found that $\sum$ X bar=357.5 and $\sum$R=8.8. If the specification limits are 14.40±0.40; and if the process is in statistical control, what conclusions can you draw about the ability of the process to produce items within specifications?

Or

2) A manufacturer purchases small bolts in cartons that usually contain several thousand bolts. Each shipment consists of a number of cartons. As part of the acceptance procedure for these bolts, 400 bolts are selected at random from each carton and are subjected to visual inspection for certain nonconformities. In a shipment of 10 cartons, the respective percentages of rejected bolts in the samples from each carton are 0,0,0.5,0.75,0,2.0,0.25,0,0.25 and 1.25. Does this shipment of bolts appear to exibit statistical control with respect to the quality characteristics examined in this inspection?

**Module II**

1) Explain about single, double and multiple sampling techniques in detail

Or

2) A single sampling plan has n=110 and c=3. The lot size is large in comparison with sample size. Compute the approximate probabilities of of acceptance of lots 0.5,1,2,3,4,5,6 and8% defective

**ModuleIII**

1)Explain in detail about series, parallel and mixed configuration and reliability with suitable examples

Or

3) Two hundred solid state electronic devices were tested to determine the failure rate of these units. Testing was conducted for 1000 hrs with four units failing after 425,575,650,920 hrs respectively

   a) Assuming a constant failure rate calculate the total unit hours on test,V(t), where failed units are immediately replaced.
   b) Where failed units are not replaced
   c) What is the probability that one of these units will survive for a required 200,300 and 400 hrs of operation?

(3x20=60 marks)

Model Question

# Eighth Semester B.Tech Degree Examination, April/May 2012

## (2008 scheme)

### Branch: Mechanical Engineering

### 08-806.1 ElectiveV: PROPULSION ENGINEERING

Time:3 Hours Max.Marks:100

**Part A**

*Answer all questions*

1. What are the main propulsive devices and what is the basic difference between them?
2. Why a ram jet engine does not require a compressor and a turbine?
3. What is the total thrust comprised of? Derive a general equation for the thrust developed in a jet engine?
4. Define propulsive efficiency?
5. Which compressor, axial flow or centrifugal, is more suitable for a turbojet engine? Why
6. What do you mean by stalling of compressors?
7. What do you mean by combustion instability in LPR? Discuss?
8. Compare the advantages and disadvantages of solid and liquid propellants?
9. Differentiate between neutral burning, progressive burning and regressive burning, as applied to solid propellants?
10. What you mean by multi-staging of rockets? Explain?

**Part B**

*Answer all questions*

Module I

1.a. Draw a schematic diagram of turbo jet engine and explain it's working with the help of T-S diagram? 15

1.b. Define ram efficiency and derive an expression for it? 5

OR

2. A jet propelled plane consuming air at the rate of 20 kg/s, is to fly at a Mach number 0.6 at an altitude of 5000 m where the pressure is 0.55 kgf/cm$^2$ and temperature is – 20 $^0$C. The diffuser which has a pressure coefficient of 0.9

decelerates the flow to a negligible velocity. The compressor pressure ratio is 5 and the maximum temperature in the combustion chamber is 1000 $^0$C. After expanding in the turbine, the gasses continue to expand in the nozzle to a pressure of 0.7 kgf/cm$^2$. The isentropic efficiencies of the compressor, turbine and nozzle are 0.81, 0.85 and 0.92 respectively. The calorific value of the fuel is 1000 kcal/kg. Assuming that the products of combustion have the same properties as air, find

(a) the power input to the compressor;
(b) the power output of the turbine;
(c) the fuel-air ratio;
(d) the exit Mach number;
(e) the thrust provided by the engine; and
(f) the thrust power developed. 20

Module II

3.a. What are the main types of gas turbine combustion chambers? Discuss their merits and demerits? 10

3.b. With a neat sketch explain the working of nuclear rockets? 10

OR

4.a. what are the different methods of improving the take of characteristics of a turbo jet engine? 10

4.b. Explain the working of solar rockets? 10

Module III

5.a. The following measurements were made in a sea level test of solid propellant rocket motor.

| | |
|---|---|
| Burn duration | 40sec |
| Initial mass before test | 1210kg |
| Mass of rocket motor after test | 215kg |
| Average thrust | 62250N |
| Chamber pressure | 7.00MPa |
| Nozzle exit pressure | 0.070MPa |
| Nozzle throat diameter | 0.0855m |
| Nozzle exit diameter | 0.2703m |

Determine mass flow rate, actual average exhaust velocity, characteristic velocity, effective exhaust velocity(c) and specific impulse ($I_s$) at sea level. And c and $I_s$ at 1000 and 25000m altitude. Assume an invariant thrust and mass flow rate and negligible short start and stop transients? 12

5.b. Explain different types of injectors used in liquid propellant rockets? 8

OR

6.a. What are the different types igniters used in solid propellant rocket motors? 10

6.b. With the help of a neat sketch, explain the working of pressurized feed system used in LPR? 10

# VIII Semester BTech, Examination January 2012

Mechanical Engineering

## Elective-V 08.806.11 - Computational Fluid Dynamics

Time allowed: Three hours | Maximum: 100 Marks

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### Part A
Answer all questions.

1. Explain in brief, the basic steps in any CFD analysis.
2. Discuss the nature of solution possible for a fluid dynamics problem.
3. Differentiate between structured and unstructured meshes.
4. Write down the equation of transport of a quantity in a flow field involving diffusion. Also write down the mathematical nature of convection and diffusion terms.
5. Obtain an analytical solution of 1D Cartesian diffusion equation.
6. Differentiate between implicit and explicit schemes for integration with respect to time.
7. Discuss the concept of eddy diffusivity.
8. What is the requirements on the mesh while using wall function in modeling a turbulent boundary layer.
9. What do you mean by contour plot. Discuss the steps by an example.
10. What do you mean by Lagrangian co-ordinate. Mention a method to solve Lagrangian co-ordinate.

(10x4 marks)

### Part B
### Module I

11. (a) Write down the governing equations of flow of an incompressible fluid in three dimensions. Write down the meaning of each term. (10 marks)
(b) Give a computational domain for the numerical solution of potential flow over a cylinder. Write down the conditions to be used on all the boundaries. Classify each of the boundary conditions as either Dirichlet or Neumann. (10 marks)

or

12. (a) Derive the equation for forward elimination and backward substitution of Tridiagonal system of equations using TDMA. (10 marks)
(b) Solve the following system of equations using TDMA. $T_1 - 4T_2 - T_3 = 0, T_2 - 4T_3 - T_4 = 0, T_3 - 4T_4 - T_5 = 0, T_4 - 4T_5 - T_6 = 0$, given that $T_1 = 100$ and $T_2 = 30$. (10 marks)

## Module II

13. (a) Discuss any two turbulence models used in CFD. (10 marks)
(b) Differentiate between central difference scheme and upward scheme for the discretisation of convection terms. (10 marks)

or

14. (a) Give a description of QUICK scheme. How is it different from Upwind scheme? (10 marks)
(b) Discuss any four characteristics of turbulent flow. (10 marks)

## Module III

15. (a) Discuss the different methods for presenting results of a CFD analysis. (10 marks)
(b) Discuss the basic steps requires for determining a velocity vector plot. (10 marks)

or

16. (a) What is SIMPLE algorithm? Write down the sequential steps of SIMPLE algorithm. (10 marks)
(b) Write a note on a density based solution for compressible flow. (10 marks)