

Reg. No. :

Name :

**VI Semester B.Tech. (Reg./Sup./Imp.-Including Part Time) Degree
Examination, July 2011
PT 2K6/2K6 CE/ME/EE 601 : ECONOMICS AND MANAGEMENT
(2007 Admissions)**

Time : 3 Hours

Max. Marks : 100

Instruction : Answer all questions.

1. a) Explain the scarcity definition of economics.
b) What are the fundamental problems of an economy ?
c) What are the classification and characteristics of human wants ?
d) Explain different types of elasticity.
e) What are the peculiarities of labour ?
f) Explain technical and economic efficiency.
g) What are the functions of money ?
h) What are the functions of a commercial bank ? (8×5=40)

2. a) What are definitions of economics ? Explain the nature of the subject economics. 15

OR

b) What are the different types of business organization ? 15

3. a) State and explain the concept of elasticity, its different types and illustrate different cases of elasticity. 15

OR

b) Explain the laws of demand and supply. Illustrate the concept of equilibrium price. 15



4. a) What is production ? What are the factors of production ? Its characteristics and peculiarities. **15**

OR

b) What are economies of scale ? What are the advantages of large scale production ? **15**

5. a) What are the conditions of perfect competition ? State and illustrate the price output determination under perfect competition in different time periods. **15**

OR

b) What are the features and functions of central banks ? Explain the methods of credit control. **15**

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VI Semester B.Tech. (Reg./Supple./ Imp. – Including Part Time)
Degree Examination, July 2011
(2007 Admn.)

PT 2K6/2K6 ME 602 : DYNAMICS OF MACHINERY

Time : 3 Hours

Max. Marks : 100

Instructions : i) Answer all questions.
 ii) Missing data if any may be suitably assumed.

1. a) With suitable examples differentiate the types of vibration.
 - b) Write a note on transmissibility.
 - c) What is meant by self excited vibrations ? How they differ from forced vibration ? Explain.
 - d) Write a note on non linear vibration.
 - e) Give classification of followers.
 - f) Derive the expression for couple causing precession for a spinning disc.
 - g) Differentiate function of flywheel from that of a governor.
 - h) Explain the method of balancing of several masses in the same plane. **(8×5=40)**
2. a) With a suitable example derive the expressions for displacement of the given mass from mean position in 'over damping' 'under damping' and 'critical damping' cases. **15**

OR

- b) A coil of spring stiffness 4 N/mm. Supports vertically a mass of 20 kg at the free end. The motion is resisted by the oil dashpot. It is found that the amplitude at the beginning of the fourth cycle is 0.8 times the amplitude of previous vibration. Determine the damping force per unit velocity. Also find the ratio of frequency of damped and undamped vibrations. **15**

P.T.O.



3. a) Considering a three degree freedom system, explain the method of obtaining influence coefficients and natural frequencies. Also draw the mode shapes for this system. 15

OR

- b) Write a note on :
- i) Matrin formulation
 - ii) Instability in a oil film lubricated bearing. 15

4. a) Derive the expressions for velocity and acceleration in case of a symmetrical tangent cam with reciprocating roller follower when roller is in contact with
- i) Straight flank
 - ii) Circular nose. 15

OR

- b) A ship is propelled by a turbine rotor which has a mass of 5000 kg and speed 2100 rpm. The rotor has a radius of gyration of 0.5 m and rotates in clockwise direction when viewed from stern. Find the gyroscopic effect in the following conditions.
- i) The ship runs at a speed of 16 knots, steers to the left in a curve of 60 m radius. (1 knot = 1.86 km/hr).
 - ii) The ship pitches 6° above and 6° below the horizontal position. The bow descends with its maximum velocity. The motion due to pitching is SHM and periodic time is 20 secs.
 - iii) The ship rolls at a certain instant has an angular velocity of 0.03 rad/s. Clockwise when viewed from the stern. 15

5. a) A single cylinder single acting 4 stroke gas engine develops 18.4 kW at 300 rpm, workdone by the gases during the expansion stroke is 3 times the work done on the gases during compression stroke. The work done during suction and exhaust strokes being negligible and total fluctuation is 2% of the mean. The turning moment diagrams during compression and expansion are assumed to be triangular in shape. Find the moment of inertia of the flywheel. 15

OR

- b) Explain and derive the equations for the terms :
- i) Variation of fractive force
 - ii) Swaying couple
 - iii) Hammer blow. 15



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**VI Semester B.Tech. (Reg./Sup./Imp. – including Part Time) Degree
Examination, July 2011
(2007 Admn.)
PT2K6/2K6ME603 : HEAT AND MASS TRANSFER**

Time: 3 Hours

Max. Marks: 100

Instructions : i) Answer all questions.

ii) Use of Heat and Mass Transfer and Thermodynamics data hand books is permitted.

iii) Missing data, if any may be suitably assumed.

1. a) Explain the significance of critical radius of insulation and derive the expression for the same in case of sphere.
- b) Write a note on transient heat conduction in semi-infinite solids.
- c) Define and briefly explain the significance of Reynold's number and Grashoff's number.
- d) Write a note on combined natural and forced convection mechanism.
- e) Define and differentiate between 'film condensation' and 'Dropwise condensation'.
- f) Define and explain the significance of NTU.
- g) State and explain Lambert's cosine law.
- h) Derive the expression for mass transfer rate through a plane membrane. (8×5=40)

2. a) A composite slab is made up of two layers of different materials A and B such that layer A has conductivity as $K_A = 0.5 (1+0.08T)$ and is 5 cm thick, while the layer B has conductivity 24W/mK and is 2cm thick. The exposed surface of layer A is insulated while that of the layer B is exposed to the fluid at 20°C where the heat transfer coefficient is 30 W/m²K. If the temperature at the interface is 80°C, find :
 - i) Rate of heat flux from the slab to the fluid.
 - ii) Maximum temperature in the system.
 - iii) The distance of a point at 90°C from insulated surface.

15

OR

P.T.O.



- b) What do you mean by lumped system ? Derive the expressions for temperature distribution, instantaneous heat transfer and total heat transfer in case of a lumped system. 15
3. a) Air at 20°C and atmospheric pressure is flowing over a flat plate at a velocity of 3 m/s. If the length of the plate is 30 cm and at a temperature of 60°C, calculate for unit width of the plate.
- i) Thickness of velocity and thermal boundary layer.
 - ii) Local and average friction coefficient.
 - iii) Local and average heat transfer coefficient.
 - iv) Total drag force on the plate. 15
- OR
- b) A hot square plate of length 50 cm at 100°C is exposed to atmospheric air at 20°C. Find the heat loss from both surfaces of the plate if the plate is horizontal . What is the percentage increases in rate of heat transfer if the plate is assumed to be vertical ? 15
4. a) Saturated steam at 85°C condenses on the outer surface of 225 horizontal tubes of 1.27 cm OD arranged in 15 by 15 array. Tube surfaces are maintained at a uniform temperature of 75°C. Calculate rate of condensation per meter length of the tube bundle. 9
- b) Briefly explain the different forms of boiling heat transfer. 6
- OR
- c) A cross flow heat exchanger (both fluids unmixed) and having a heat transfer area of 8.4 m² is to heat air with water. Air enters the heat exchanger at 18°C with a mass flow rate of 2 kg/s, while water enters at 90°C with a mass flow rate of 0.25 kg/s. The overall heat transfer coefficient is 250 W/m²K. Calculate the exit temperature of the two fluids and the heat transfer rate. 15
5. a) For a black body enclosed in a hemispherical space, prove that emissive power of the black body is π times the intensity of radiation. 15
- OR
- b) Write short notes on :
- i) Ficks law
 - ii) Steady state equimolar counter diffusion. 15

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**VI Semester B. Tech. (Reg. / Supple. / Imp. – Including Part-Time)
Degree Examination, July 2011
(2007 Admission)
PT2K6/2K6 ME 604 : ADVANCES IN MANUFACTURING
ENGINEERING**

Time : 3 Hours

Max. Marks : 100

Instruction : Answer all questions.

PART – A

1. a) What are the major hardware components of the computer system ?
- b) What are the benefits of CAD ?
- c) What is M-code and G-code in NC part programming ?
- d) Explain cutter specification statement in APT programming.
- e) What is group technology ? Explain briefly.
- f) What are the benefits of FMS ?
- g) Define Industrial robot. Write six basic motions of robot.
- h) What is flexible manufacturing system ? Explain. (8×5=40)

PART – B

2. a) What is the role of manufacturing database in a product life cycle ?
Elaborate. 8
- b) Describe about the functions of a graphics package in CAD/CAM
environment. 7

OR

- c) Explain any two basic technology of computer graphics terminal for
generating the image on CRT screen. 8
- d) Discuss about B-rep and CSG representation of solids in CAD. 7

P.T.O.



3. a) Explain the three types of NC motion control system. 8
 b) What are the basic components of NC machine ? Explain. 7

OR

- c) Explain the various Geometry statement used in APT. 8
 d) Write a manual part program for milling the component to the shape shown in fig. 1. Use appropriate machining parameters. 7

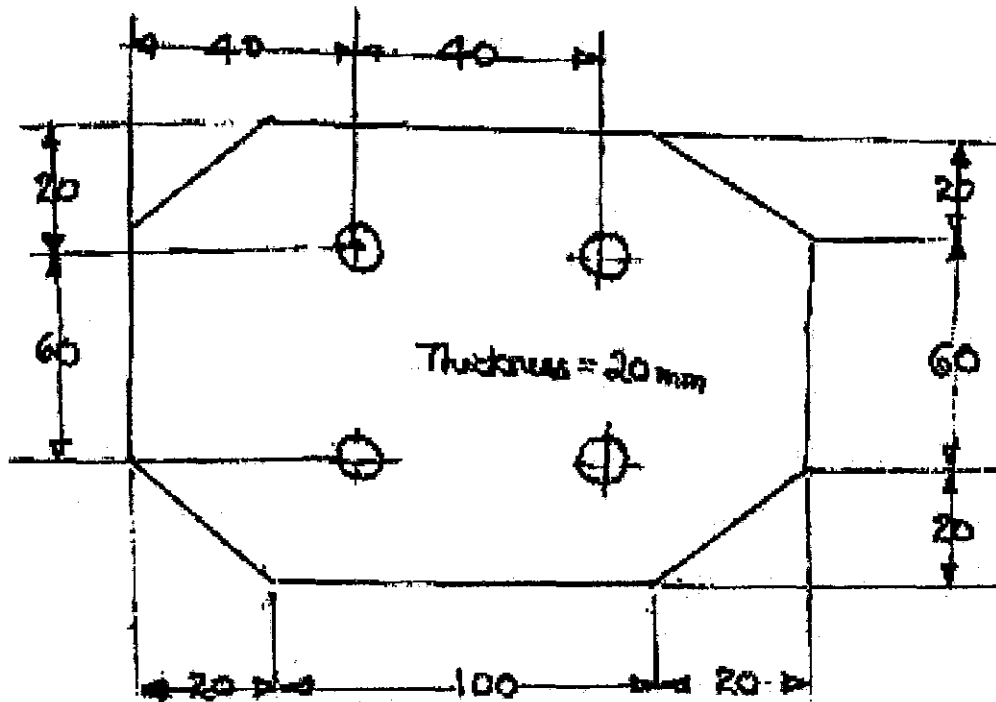


Fig. 1

ALL DIMENSIONS IN mm

4. a) Describe OPTIZ part classification and coding system with example. 8
 b) Explain the various components of FMS. 7
 OR
 c) Explain different configuration of the robot. 8
 d) Explain the different robot programming methods. 7
 5. a) Explain FMS layout configuration. 8
 b) Explain the functions of computer in FMS. 7
 OR
 c) Discuss the various work handling equipment in FMS. 10
 d) What is artificial intelligence in FMS ? Explain. 5

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**VI Semester B.Tech. (Reg./Sup./Imp. – including Part Time) Degree
Examination, July 2011
(2007 Admn.)**

PT2K6/2K6ME605 : OPERATIONS RESEARCH

Time: 3 Hours

Max. Marks : 100

1. a) Briefly explain different matrix operations. (8×5=40)
- b) With suitable examples explain vector space and Euclidian space.
- c) Define the following with respect to linear programming problems
- i) Initial basic feasible solution
 - ii) Slack and surplus variables
 - iii) Optimal solution.
- d) Write a general expression for a linear programming problem with all its notations.
- e) Compare the general expressions for a transportation and assignment problems.
- f) State the different rules of dominance used in solving 2-person games.
- g) Briefly explain the different elements in the queuing system.
- h) Briefly explain the different ways in which service counters can be arranged.
2. a) Find the rank of the following matrix :

$$A = \begin{bmatrix} -2 & -1 & -3 & -1 \\ 1 & 2 & 3 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 \end{bmatrix}.$$

7

P.T.O.



b) Solve the given set of linear equations by matrix method.

$$x + 2y + 3z = 14$$

$$4x + 5y + 7z = 35$$

$$3x + 3y + 4z = 21.$$

8

OR

c) Explain convex hull of the points. For the points $a_1 = (6, 6)$, $a_2 = (9, 12)$, $a_3 = (3, 9)$ find the convex hull.

7

d) Consider the set of 4 vectors $a_1 = (2, 1)$, $a_2 = (1, 3)$, $a_3 = (2, 3)$ and $a_4 = (4, 2)$. Find linearly dependent, independent and spanning sets.

8

3. a) Solve the following linear programming problem.

$$\text{Maximize } Z = 4x_1 + 3x_2 + 6x_3$$

$$\text{Subject to } 2x_1 + 3x_2 + 2x_3 \leq 440$$

$$4x_1 + 3x_3 \leq 470$$

$$2x_1 + 5x_2 \leq 430, x_1, x_2, x_3 \geq 0.$$

15

OR

b) Minimize $Z = x_1 - 3x_2 + 3x_3$

$$\text{Subject to } 3x_1 - x_2 + 2x_3 \leq 7$$

$$2x_1 + 4x_2 \geq -12$$

$$-4x_1 + 3x_2 + 8x_3 \leq 10$$

$x_1, x_2, x_3 \geq 0$, solve the above LPP by simplex method.

15

4. a) A Company has factories at A, B and C which supply warehouses at D, E, F and G. The factory capacities are 230, 280 and 180 respectively for regular production. If overtime production is utilized, the capacities can be increased to 300, 360 and 190 respectively. The current warehouse requirements are 165, 175, 205 and 165 respectively.

Unit shipping costs in rupees between the factories and the warehouses are

To \ From	D	E	F	G
A	6	7	8	10
B	4	10	7	6
C	3	22	2	11

Determine the optimum distribution for the company to minimize costs.

15

OR



b) Solve the game given the table below by graphical method.

		B			
		y_1	y_2	y_3	y_4
A	x_1	19	6	7	5
	x_2	7	3	14	6
	x_3	12	8	18	4
	x_4	8	7	13	-1

7

c) A company has a team of four salesmen and there are four districts where the company wants to start its business. After taking into account the capabilities of salesmen and the nature of districts, the company estimates that the profit per day in rupees for each salesman in each district is as below :

		District			
		1	2	3	4
Salesman	A	16	10	14	11
	B	14	11	15	15
	C	15	15	13	12
	D	13	12	14	15

8

5. a) Briefly explain atleast 5 operating parameters of a queuing system.

10

b) Four counters are being run on the frontier of a country to check the passports and necessary papers of tourists. The tourists choose a counter at random. If the arrival at the frontier is Poisson at the rate of λ and the service time is exponential with parameter $\lambda/2$. What is the steady state average queue at each counter ?

5

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VI Semester B.Tech. (Regular/Supp./Imp.-Including – Part Time)
Degree Examination, July 2011
(2007 Admn.)
PT2K6/2K6ME 606 (A) : NUMERICAL METHODS

Time : 3 Hours

Max. Marks : 100

Instruction : Answer all questions.

1. a) Find the root of $x^3 - 4x - 9 = 0$ using bisection method. Carry out four iterations.
- b) Give the geometrical interpretation of Newton-Raphson method.
- c) Show that n^{th} difference of a polynomial of n^{th} degree is a constant.
- d) Find the divided difference table for the following data :

x	5	7	11	13	17
$f(x)$	150	392	1452	2366	5202

- e) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Trapezoidal rule. Take $h = 1$.
- f) Find y at $x = 0.1$. Using Taylor series method to 5 decimal places
 $\frac{dy}{dx} = x^2y - 1, y(0) = 1$.
- g) Solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0) = 1$ at $x = 0.2$ using Runge Kutta 4th order method.
- h) Give the standard 5 point formula and diagonal 5 point formula to solve Laplace equation with scheme. (5×8=40)

P.T.O.



2. a) Find the smallest positive root of $x^2 \left| \sin \sqrt{x} \right| = 5$ using Bisection method.
Carry out 4 iterations.

b) Test the consistency of the system and find the solution if it is consistent using Gauss Elimination.

$$x + 2y - z = 3 ; 3x - y + 2z = 1 ; 2x - 2y + 3z = 2 ; x - y + z = -1. \quad (8+7)$$

OR

2. a) Derive an iterative formula to find the square root of a number using Newton Raphson method and hence find $\sqrt{15}$.

b) Find the solution using Jacobi method . Carry out 3 iterations.

$$3x + 8y + 29z = 71 ; 83x + 11y - 4z = 95 ; 7x + 52y + 13z = 104. \quad (8+7)$$

3. a) Find $f(2.3)$ and $f(4.5)$ using forward difference interpolation

x	-2	0	2	4	6
f(x)	5	11	14	20	24

b) Obtain x when $f(x) = 19$ using Lagrange inverse interpolation.

x	0	1	2
f(x)	0	1	20

(8+7)

OR

3. a) The following table gives number of students scoring marks in a subject. Using forward difference formula, find the number of students scoring marks less than 55

Marks	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80
No. of Students	31	42	51	35	31

b) Fit a straight line for the data

x	1	2	3	4	5	6
y	1200	900	600	200	110	10

(8+7)



4. a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Simpsons $\frac{3}{8}$ rule and hence find the value of π .
Take $h = \frac{1}{6}$.

b) Solve $\frac{dy}{dx} = x^2 + y$ for $x = 1.2, 1.4$ using Eulers modified method
 $y = 2, x = 1$. (8+7)

OR

4. a) Evaluate $\int_0^{\pi/2} e^{\sin x} dx$ dividing the interval into 6 equal parts using Simpsons $\frac{1}{3}$ rule and estimate the max. error.

b) Solve $\frac{dy}{dx} = x + y$ $y(1) = 0$ at 1.1 and 1.2 using Taylor series method. (8+7)

5. a) Solve $\frac{dy}{dx} = \frac{1}{1+x^2} - 2y^2$ $y(0) = 0$ at $x = 0.5$ in 2 steps using Runge Kutta 4th order method.

b) $\frac{dy}{dx} = 2e^x - y$ $y(0) = 2, y(0.1) = 2.01, y(0.2) = 2.04, y(0.3) = 2.09$ find y at 0.4 and 0.5 using Milne's P - C method. (8+7)

OR

5. a) Solve the partial differential equation $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} = -10(x^2 + y^2 + 10)$ over the square mesh $x = 0 = y, x = 3 = y$ with $u = 0$ on the boundary and mesh length = 1.

b) Solve $\frac{dy}{dx} = \frac{x+y}{2}$ at $x = 2$ using Adam Bashforth method $y(0) = 2$
 $y(0.5) = 2.636$ $y(1.0) = 3.595$ $y(1.5) = 4.968$. (8+7)

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**VI Semester B.Tech. (Regular/Suppl./Imp.-Including Part Time) Degree
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PT2K6/2K6 ME 606 (D) : TOOL ENGINEERING AND DESIGN

Time : 3 Hours

Max. Marks : 100

*Instructions : i) Answer all questions.
ii) Assume any missing data.*

1. a) Write a note on reamers.
- b) Write a note on tipped tools.
- c) Explain centre of pressure with respect to blanking operation.
- d) Explain blanking.
- e) Explain concentric location.
- f) Write a note on drill bushes.
- g) Write a note on locators.
- h) Sketch plate jig. (8×5=40)
2. a) Explain vibration damping of boring bars. 10
- b) Sketch a milling cutter. 5
- OR
- c) Write a note on cutting power estimation in turning. 15
3. a) Explain progressive die with suitable examples. 15
- OR
- b) Explain about scrap-scrip layout. 15

P.T.O.

