[Total No. of Questions: *12*] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE

[4364]-487

B. E. (*Production*) Examination - 2013

Microprocessor Applications (Elective-I) (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions: *Answer any three questions from each section.*

1 ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and***
2 ***Answer Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II.***
3 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
4 *Neat diagrams must be drawn wherever necessary.*
5 *Assume suitable data, if necessary.*
6 *Figures to the right indicate full marks.*
7 *Use of non-programmable electronic calculator is allowed.*

SECTION -I

Q.1	A	Compare the RISC processor and CISC processor	8
	B	Explain the areas of applications of implementing microprocessors.	8

OR

Q.2	A	Explain Harvard and on Neumann Architecture.	8
	B	Explain the applications of microcontroller in various fields.	8
Q. 3	A	Explain the architecture of 8085 microprocessor.	8
	B	Compare the functioning of Address Bus, Data Bus and Control Bus.	8

OR

Q. 4	A	Explain the bus organization of 8085 microprocessor	8
	B	Write short note on following i) Memory interface in 8085 ii) Interrupts in 8085	8
Q. 5	A	Explain the architecture of 8051 microcontroller	8
	B	Explain the following features of 8051 microcontroller i) Input output port structure ii) Timers and counters	10

OR

Q. 6	A	Explain the register banks in 8051 microcontroller.	8
	B	Explain the internal & external memory interface as well as memory organization in 8051 microcontroller.	10

SECTION II

Q. 7	A	Explain the significance of Assembly Language programming.	8
	B	Explain Data transfer instruction using 8051.	8
		OR	
Q. 8	A	Explain Arithmatic and logical instructions used in 8051.	8
	B	Write a short note on IDE: software development tools.	8
Q. 9	A	Explain with block diagram components of PLC.	8
	B	Construct a ladder logic diagram for CNC machining center.	8
		OR	
Q. 10	A	Explain various PLC output instructions used in construction of ladder logic diagram.	8
	B	Explain use of PLC in controlling of operation of cooling equipment with suitable ladder diagram	8
Q. 11	A	How RS 485 is used for data communication in interfacing.	8
	B	Explain the level control of water using microprocessor.	10
		OR	
Q. 12	A	Explain data transmission and reception using RS-232.	8
	B	Explain how the speed can be measured and controlled using microprocessor in rotary mechanical system.	10

UNIVERSITY OF PUNE

[4364]-490

B. E. (Production)

Elective-II

SIMULATION AND MODELING

(Semester-I) (2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :4]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any three question from each section.

*(2) Answers to the **two sections** should be written in **separate answer-books**.*

(3) Neat diagram must be drawn wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

SECTION-I

Q1.

a) What is simulation? Explain the step involved in simulation study with the help of flow chart [8]

b) Explain the components of system in simulation study with the help of example. [8]

OR

Q2.

a) Distinguish between discrete and continuous systems with example [8]

b) State the events and activities associated with the operation of material handling system? [8]

Q3.

a) What is system and system environment? List the components of a system with example [8]

b) A grocery store has one checkout counter. Customers arrive at this checkout at random from 1 to 8 minutes apart and each interval time has the same

probability of occurrence. The service time vary from 1 to 6 minutes, with probability given below:
Simulate the arrival of 6 customers and calculate
Average waiting time for a customer
Probability that a customer has to wait
Probability of a server being idle
Average service time
Average time between arrival
Use the following sequence of random numbers.

Service (min)	1	2	3	4	5	6
Probability	0.10	0.20	0.30	0.25	0.10	0.05

Random digit for arrival	913	727	015	948	309	922
Random digit for service time	84	10	74	53	17	79

Assume that the first customer arrives at time θ. Depict the simulation in a tabular form

OR

Q4.

a) Consider the following continuously operating job shop. Inter arrival times of jobs are distributes and shown in Table 1. Processing time for jobs are normally distributed with mean 50 minutes and standard deviation 8 minutes. Construct a simulation table, perform a simulation for 5 new customers. Assume that when the simulation begins there is one job being processed (schedule to be completed in 25 minutes) and there is one job with a 50 minute processing time in the queue. [10]

Table1: Distribution of time

Time between arrival (Hr)	Probability
0	0.23
1	0.37
2	0.28
3	0.12

(a) What was the average time in the queue for the 5 new jobs?
(b) What was the average processing time of the 5 new jobs?
(c) What was the maximum time in the system for 5 new jobs?

(d) Explain the Monte-Carlo simulation methods and their application in inventory

b) Monte Carlo simulation is a special case of stochastic simulation? Comment [8]

OR

Q5.

a) Explain briefly the steps involved in the development of a useful model of input data [8]

b) What are pseudo random numbers? What are the problems occur while generating pseudo random numbers? [8]

OR

Q6.

a) Discuss the methods for selecting families of input distributions when input data available [8]

b) Define random number. Explain statistical properties of random numbers with example. [8]

SECTION-II

Q7.

a) Discuss the inverse transformation technique to sample from the exponential distribution [8]

b) Life test were performed on a random sample of electronic chips at 1.5 times the nominal voltage, and their lifetime (or time to failure) in days was recorded: [8]

79.919	3.081	0.062	1.961	5.845
3.027	6.505	0.021	0.013	0.123
6.769	59.899	1.192	34.760	5.009
18.387	0.141	43.565	24.420	0.433
144.695	2.663	17.967	0.091	9.003
0.941	0.878	3.371	2.157	7.579
0.624	5.380	3.148	7.078	23.96
0.590	1.928	0.300	0.002	0.543
7.004	31.764	1.005	1.147	0.219
3.217	14.382	1.008	2.336	4.562

Lifetime, usually considered a continuous variable, prepare the histogram

OR

Q8.

a) Explain chi -square goodness of fit test to accept or reject a candidate distribution. [8]
b) Describe termination and non terminating simulation [8]

Q9.

a) State the need of simulation in manufacturing and material handling systems [8]
b) Discuss about a simulation of a manufacturing shop [8]

OR

Q10.

a) State the input parameters to be consider in manufacturing system for building simulation model [8]
b) Discuss about a simulation of a flexible manufacturing systems. [8]

Q11.

a) Explain in detail important feature of witness simulation software [10]
b) Which are the major industries where simulation is used? Enlist various simulation software used in simulation of discrete system manufacturing and highlight important features any two simulation softwares [10]

OR

Q12. Write short note [18]

a) Advantages and Disadvantages of simulation
b) Simulation and Analytic methods
c) Discrete event simulation

[Total No. of Questions:12] **[Total No. of Printed Pages: *5*]**

UNIVERSITY OF PUNE

[4364]-497

B. E. (Production) Examination - 2013

FINITE ELEMENT ANALYSIS (2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer any three questions from Section I and any three questions from Section II*

2 *Neat diagrams must be drawn wherever necessary.*

3 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

4 *Assumptions made should be clearly stated and justified.*

SECTION -I

Q.1 A What do you understand by the finite element model? Give an example of modeling a mechanical component. 6

B Determine the nodal displacements at node 2, stresses in each material and support reactions in the bar shown in Fig. 1.due to applied force $P = 400 \times 10^3$ N and temperature rise of 30°C. given: A1 = 2400 mm^2 A2 = 1200 mm^2 E1 = 0.7×10^5 N/mm^2 E2=$2\times10^5 N/mm^2$ and $\alpha1=22x10^{-6}/C°$, $\alpha2=12x10^{-6}/C°$ E=200×10^5 N/cm^2 10

OR

Q.2 A Explain element stiffness matrix by potential energy approach 6

B For the compound section shown in fig. 2 fixed at both ends, estimate reactions at both ends and stresses when force of 1600 N is applied at the 10

change of cross section. Use penalty approach.

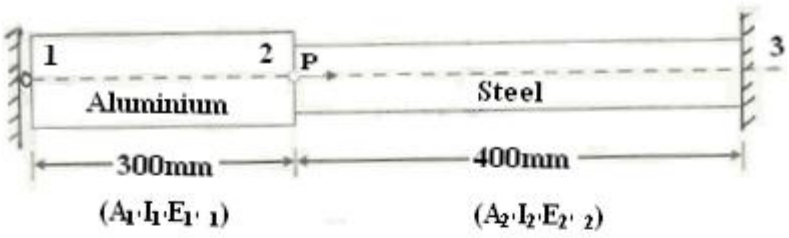


Fig.1

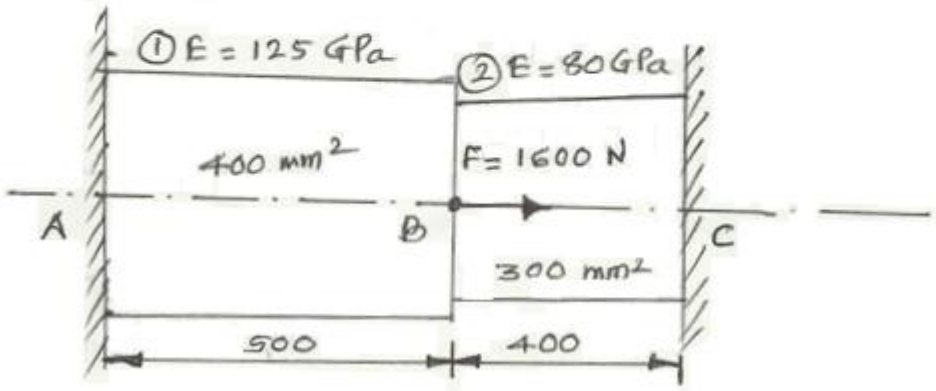


Fig. 2

Q. 3	A	Write note on banded skyline solution	4
	B	A two member truss is shown in fig. 3 The cross sectional area of each member is 200 mm^2 and the modulus of elasticity is 200 GPa. Determine the deflection reaction and stresses in each of the members.	12

OR

Q. 4	A	Discuss thermal effect in truss member	4
	B	Fig. 4 shows a truss consisting of three elements whose AE/L value is 1000 N/mm. calculate the deflection at node 2	12
Q. 5	A	Discuss finite element modeling plane frame	6
	B	A two dimensional loaded plate is shown in fig. 5. Determine the displacement of nodes 1 and 2 using plane stress condition by considering it as a single element. Ignore body forces. Also determine the reaction forces and the stresses in the element. Assume thickness as 10mm, E=70 GPa and	12

μ=0.3

OR

Q. 6 A Explain two dimensional problem using constant strain triangle 8

B The stresses at node points 1,2 and 3 are 90,120 and 160 MPa respectively. Determine the stress at point P for the coordinates as shown in the fig.6 8

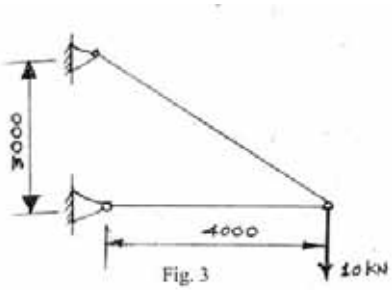


Fig. 3

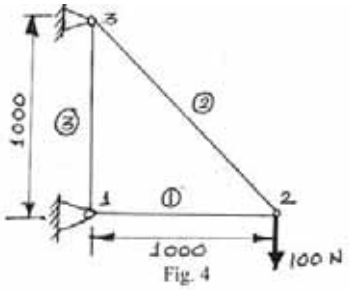


Fig. 4

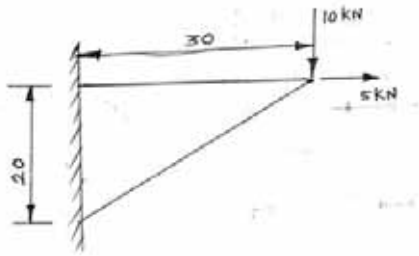


Fig. 5

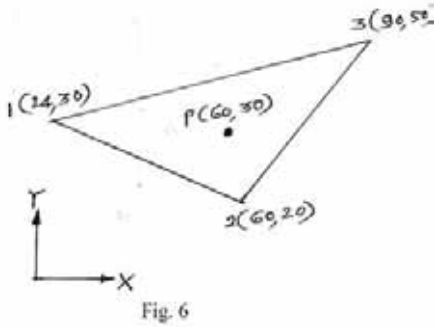


Fig. 6

SECTION II

Q. 7 A Discuss the generalized three dimensional stiffness matrix of a beam Element. 6

B Analyze the beam shown in Fig.7 by finite element method and determine the end reactions. Also determine the deflections at mid spans given E=2×10^5 N/mm^2 and I=5×10^{6}mm^4 12

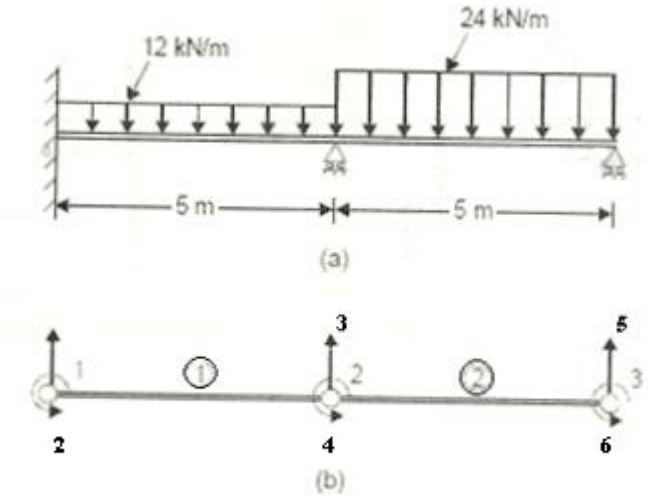


Fig.7.

OR

Q. 8 A Fig.8. shows an indeterminate pin connected plane stress with cross sectional area of diagonal members equal to 2000 mm^2 and all other members with cross sectional area of 1000 mm^2. If Young's modulus E=200kN/mm^2 12

i) Assemble global stiffness matrix

ii) Determine load vector if temperature of member 1-3 increases by 25°C. given α=12x10^{-6}/°C

iii) Determine load vector if member 1-3 is longer by 0.2 mm.

iv) Introduce Boundary Conditions

B Discuss ISO- parametric elements 4

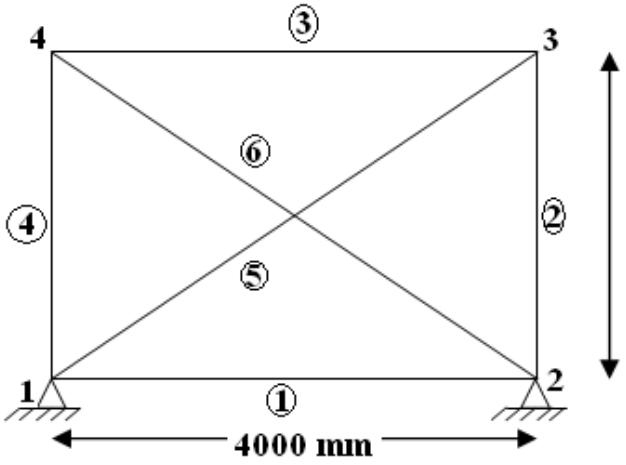


Figure 8

Q. 9 A Discuss thermal effects in 1D elements 6

B A load Member is as shown in fig. 9. The loading is initially done at 20°c. The temperature the rises to 60°c. Determine the nodal displacements and the elemental stresses developed. 10

OR

Q. 10 A Discuss briefly thermal effects in 2D elements 4

B Consider the bar shown in fig.10. Determine the nodal displacements, element stresses and reactions, if the temperature rises by 60°C. assume modulus of elasticity for the complete bar GPa and coefficient of thermal expansion as 12×10^{-6}/°c 12

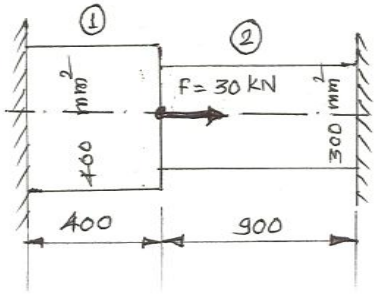


Fig. 9

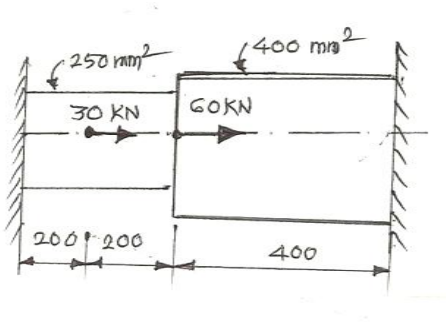


Fig 10

Q. 11 A Write short notes on: 16

a) Mesh generation
b) Functions and phases in FEA software

OR

Q. 12 A Write short notes on: 16

a) Mesh generation techniques
b) Solving a design problem using a FEA Package

[Total No. of Questions: 12] **[Total No. of Printed Pages:** 5]

UNIVERSITY OF PUNE

[4364]-493

B. E. (Production Engineering) Examination - 2013

PROCESS PLANNING AND TOOL SELECTION

(411088)(2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

2 *Answer* ***any three*** *questions from each I and three questions from section II*

3 *Your answer will be valued as a whole*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

6 *Black figures to the right indicate full marks.*

SECTION –I

Q.1 A What is a process? Which general processes are used in *' hardware industry'?* 8

B Where is the process engineer located in the plant organization? Name the Several functions performed by process engineer. 8

OR

Q.2 A Explain the role of "Communication" in the field of 8

engineering. Which departments in some way are affected by process engineer's work?

B Explain the terms 8

i) Work-piece

ii) Part-print

iii) Operation

iv) Routing

v) Tooling

vi) Work- piece control

Q. 3 A How does the shape of the part affects processing? What is the purpose of grouping related surfaces? Explain. 8

B What is meant by geometry of form? Give some examples. A cylindrical surface is specified as being round to within $\pm$ 0.03 with nominal size of 30mm. It must also be concentric to its true axis within $\pm$ 0.01. Show in the form of geometrical dimensions. 8

OR

Q. 4 A What order should be followed in establishing process areas? Why should this order be followed 8

B How to decide the nature of work to be performed on a work-piece after release of a part print from design to manufacturing department? 8

Q. 5 A Explain the concept of standardization and interchangeability? what causes work-piece variations 9

B What are the variables which interfere with the work-piece control? Draw force diagram t obtain both linear and 9

rotational equilibrium in the work-piece.

OR

Q. 6	A	What is the difference between a tolerance stack and a limit stack? What is meant by selective assembly?	9
	B	Explain why are the locators generally arranged in 3-2-1 pattern? What are the rules for locating long cylindrical and short cylindrical work-pieces?	9

SECTION II

Q. 7	A	What source of information usually available to the process engineering to assist him in making machines and equipment selection.	8
	B	What are the advantages of using tool bits and replaceable inserts as compared t solid tools?	8

OR

Q. 8	A	To what conditions can be a need for making a decision for selection of new machine arises?	8
	B	What is the source of tooling? What is difference between commercial and special tooling. Discuss their advantages and disadvantages?	8
Q. 9	A	Describe the steps of the engineering approach to selecting and planning a process.	8
	B	Explain in detail the steps involved in variant/retrieval process planning system with a neat flow chart. Name any four CAPP softwares.	8

OR

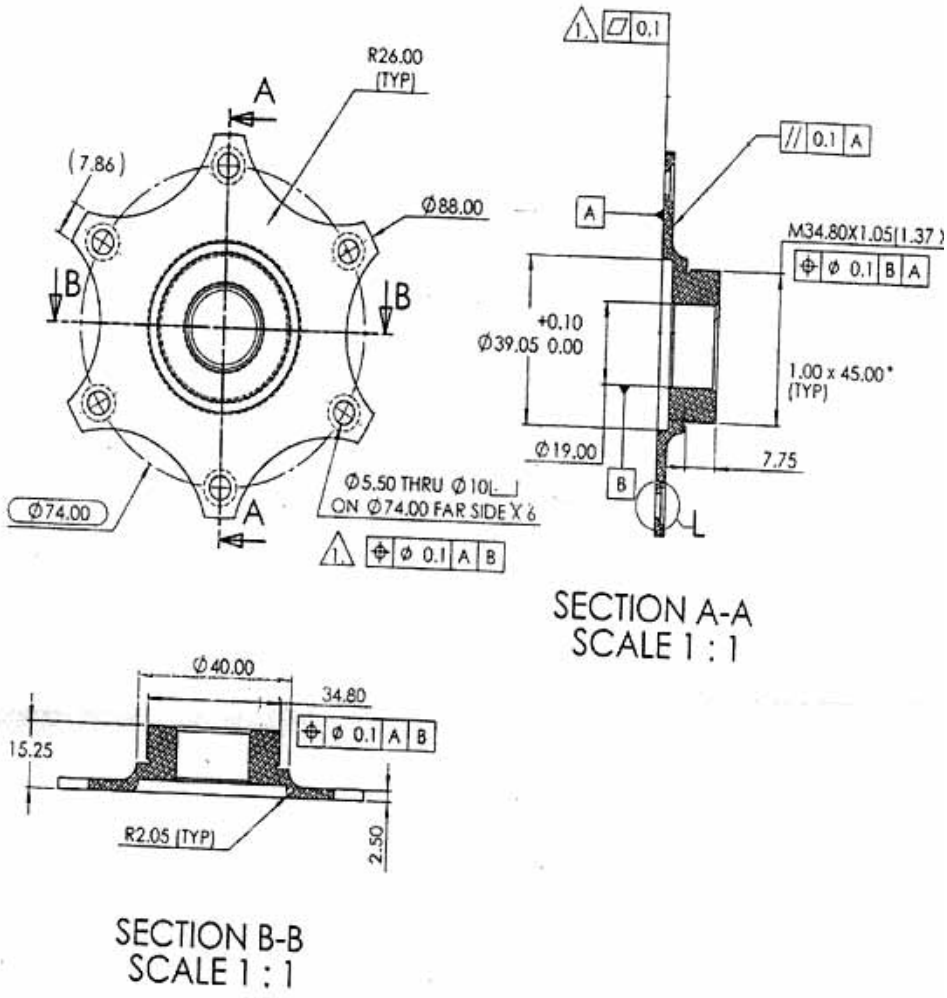
Q. 10	A	How are critical areas are generally identified? Distinguish	8

between product critical areas and process critical areas. Explain qualifying and re-qualifying operations.

B What are the advantages and limitations of computer aided process planning (CAPP) 8

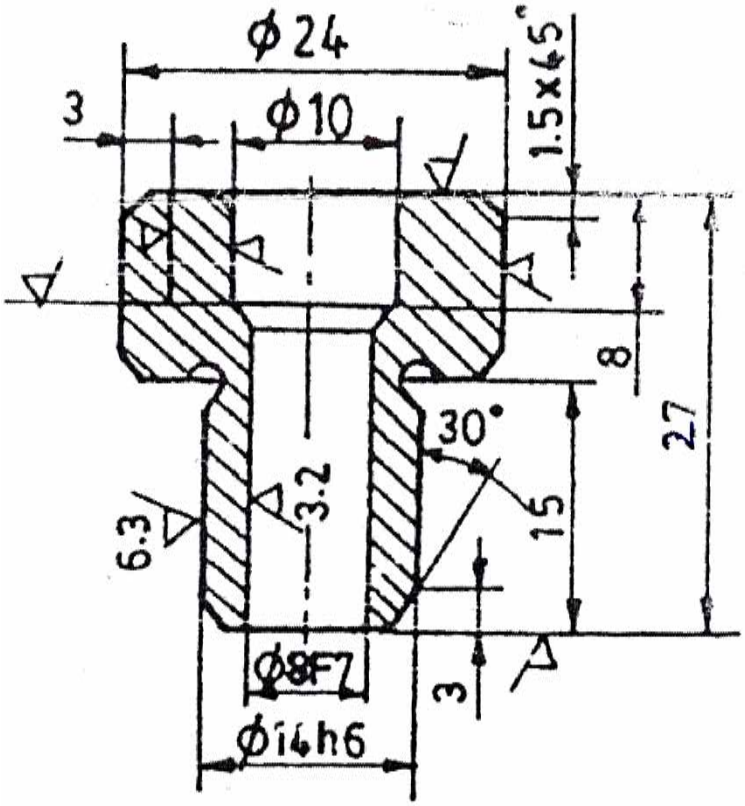
Q. 11 A Prepare a process sheet for the component as shown in Fig. 1. The required quantity: 1000/ month. Write detailed manufacturing plan, operation sequence, proper tooling and equipment selection, process parameters with sample calculations of operation time Material : Grey Cast Iron. All dimensions are in mm 18

Fig.1 Free Wheel Adaptor



OR

Q. 12 A Prepare a process sheet for a component as shown in fig .2 which is to be manufactured in batches of size 600. Analyse the part print carefully and sequence, equipments, tooling fixtures, process parameters and sample calculation of operation time. All dimensions are in mm. 1 8



$$\phi 8F7 : {}^{+0.028}_{+0.013}$$

$$\phi 14h6 : {}^{+0.000}_{-0.011}$$

+0.028

Ø Bf : + 0.013

+ 0.000

Ø14h6: - 0.011

Fig.2 Slip Bush

Title	Material	Qty	Tolerance
SLIP BUSH	MCS	600/ Batch.	$\pm$0.2

BE (Production Engg)(2008 Course)
Total Quality Management (Elective – IV)

Max Marks – 100 **Time - 3 Hrs**

4364_500

Section I

Q1	A	Define TQM. Explain historical review and growth of term 'Quality'.	(2+6)
	B	Explain Internal failure cost and Appraisal cost with two examples of each.	(4+4)
		OR	
Q2	A	State and describe any four principles of TQM.	(4x2)
	B	Describe with example: Support of senior management is key factor in TQM.	(8)
Q3	A	State Juran's ten steps of Quality Management.	(8)
	B	State steps of TQM implementation.	(8)
		OR	
Q4	A	Explain basic three precept of Deming's philosophy of TQM.	(8)
	B	What is Kaizen? Explain its use with an example on the shop- floor.	(4+4)
Q5	A	What is Quality Circle? Why Quality Circle fails? State any six reasons.	(6+3)
	B	Explain Ishikawa diagram by taking example of defects of blow hole in a casting. State its significance.	(6+3)
		OR	
Q6	A	Explain Taguchi Quality loss function.	(9)
	B	What is benchmarking? Why to benchmark? State its process.	(3x3)

Section II

Q7	A	Compare MTBF and reliability with an example of each.	(4X2)
	B	State methods of achieving higher reliability.	(4X2)
		OR	
Q8	A	Define reliability with its importance? State methods of failure.	(4+4)
	B	Explain Weibull Distribution by stating its application.	(6+2)

Q9	A	'Persons attitude will affect on TQM culture', explain.	(9)
	B	What is process capability? How it is calculated? How it is related to Three Sigma?	(3+4+2)
		OR	
Q10	A	For the industry shop of assembling four wheelers, which type of control chart is to be drawn? State its procedure.	(9)
	B	What is Quality Audit? Explain its steps in a small workshop.	(3+6)
Q11	A	Explain need of quality management standards.	(8)
	B	Describe brief content of standards for automobile industry.	(8)
		OR	
Q12	A	What is ISO9001:2000 standard? State its benefits.	(4+4)
	B	Compare 'ISO9000 standard' and 'TQM'.	(4x2)

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UNIVERSITY OF PUNE

[4364]-481

B.E.(Production)Examination -2013

MACHINE TOOL DESIGN(411081)

(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1)Answer any three questions from each Section.
(2)Answers to the two sections should be written in separate answer books.
(3)Neat diagram must be drawn necessary.
(4)Figures to the right indicate full marks.
(5)Assume suitable data wherever necessary.

SECTION-I
UNIT-I

Q.1

(a)Find out the method of differentiating a special purpose machine from a general purpose machine based on the kinematic structure. (6)

(b) A eight speed gear box is to be designed for a machine tool with a minimum speed of 120 rpm and maximum speed of 1440 rpm. It is driven by a.c. Synchronous motor, rotating at 1440 rpm. Draw the best structural diagram, optimum ray diagram and the layout of gear box. (12)

OR

Q.2

(a)Deduce the expression for power in a drilling machine and show diagrammatically the forces acting on the cutting tool during machining. (10)

(b)Compare and discuss the various laws of stepped regulation in machine tool drives with a suitable example. (8)

UNIT-II

Q.3

(a)Explain the functioning and importance of different elements of machine tools during machining. (8)

(b)Explain the concept of static and dynamic rigidity in design of machine tools and state the procedure for estimating them. (8)

OR

Q.4

(a)In designing the bed of a machine tool, it is often found that the hollow rectangular cross-section is the most suitable one. Make a comprehensive evaluation of the various types of cross sections commonly used in machine tool on the basis of stress and deflection in both bending and torsion. (8)

(b)State the various systematic steps involved in designing a milling machine column having hollow rectangular cross-section. (8)

UNIT-III

Q.5

(a)Classify the various types of configuration of the guides used in machine tools.based on material,lubrication system,drives control etc. (8)

(b)What is meant by a rigidity of a lubricated slide ways? Show that the rigidity of a hydrostatic slide way is 50% more than that of hydrodynamic slide ways. (8)

OR

Q.6

(a)Discuss merits and demerits of using filled and unfilled plastics for machine tool guides. What is meant by Turcite B and why it is universally used as a suitable material for machine tool slide ways? (8)

(b)Explain and show with neat sketches at least two methods of preloading a ball lead screw. (8)

SECTION-II

UNIT-IV

Q.7

(a)Make a sketch of at least two different types of spindle ends and make a comparative evaluation of their characteristics. (10)

(b)Give the appropriate reasoning why is it necessary to preload the bearings when mounting on the spindle. (8)

OR

Q.8

(a)Explain the working principle in recirculating ball screws commonly used in CNC versions. What are its special advantages? (8)

(b)Analyze the load taken by the balls in a ball bearing used as a spindle support and show that due to contact deformation not more than 80% of the balls take the entire thrust. (10)

UNIT-V

Q.9

(a)Explain clearly with a suitable example,why damping and thermal expansion play important role in design of machine tools? (9)

(b)Describe the dynamic characteristic of the machine tool during the cutting process. (8)

OR

Q.10

(a)Show the circuit diagram for effecting 'push button' control system in a machine tool (8)

(b)With neat sketches of circuit diagrams show the functioning of a thermal relay and an electrical braking system. (8)

UNIT-VI

Q.11

(a)What is the role of aesthetics in the design of modern machine tools? (8)

(b)Explain the concept of matrices in the design of layout of machine tools with a suitable example. (8)

OR

Q.12

(a)Discuss the various steps applied during retrofitting of machine tools. (8)

(b)Justify the techniques that can be applied in the design of machine tool structures typically for special purpose machines (SPM's). (8)

UNIVERSITY OF PUNE

[4364]-482

B.E. (Production)Examination 2013

MANUFACTURING AUTOMATION

(2008 Pattern)

[Total No. of Questions:] **[Total No. of Printed pages :2]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **any three** questions from each section*

*(2) Answers to the **two Sections** should be written in separate answer-books*

(3) Neat diagrams must be drawn wherever necessary.

(4) Figures to the right indicate full marks

(5) Assume suitable data, if necessary.

SECTION-I

Q.1 a) What do you understand by the term contamination? What are different sources of contamination in hydraulic system? Explain in brief [8]

b) Classify different pumps used in hydraulic system. Sketch typical operating characteristics of these pumps. What are the factors influencing these characteristics [8]

OR

Q.2 a) Enumerate the advantages and disadvantages of hydraulic and pneumatic system. [8]

b) A pump has displacement of 98.4cm3/rev. It delivers 0.00152 m3 /s at 1000 rpm and 70 bar. If the prime mover input torque is 124.3m-N. Determine: a) Overall efficiency of the pump [8]

b) Theoretical torque required to operate the pump

Q.3 a) Draw with neat sketch of hydraulic circuit for synchronization of cylinder and explain its features [8]

b) Explain hydraulic circuit for punching operation using intensifier. [8]

OR

Q.4 a) Draw a neat sketch and explain the working of pneumatic circuit for control of double acting cylinder. [8]

b) Explain in brief about gas charges accumulator [8]

Q.5 Draw a neat sketch and explain working of (any there) [18]

a) Air compressor b) Pneumatic actuators

c) Speed control circuit d) Time delay valve

OR

Q.6 a) Draw a pneumatic circuit to actuate the two cylinder in following sequence i)Cylinder 1extend ii)Cylinder 2extend iii)Cylinder1retract iv)Cylinder 2rectract [10]

b) Draw a neat sketch of typical 5 way 2 position direction control valve which is used to operate a large pneumatic cylinder [8]

SECTION-II

Q.7 a) Explain proportional mode in PID algorithm [8]

b) Explain briefly internal architecture of 8085 microprocessor [8]

OR

Q.8 a) An integral controller gives output initially 50%, Gain =2, reset=2 minutes per repeat A direct acting controller control is subjected to a sustained error of 5% What is the output after 4 minutes? [8]

Q.8 b) State the programming languages used for PLC programming and explain ladder logic diagram. Also construct a ladder diagram for following boolean equations [8]

i) $y=(x1+x2).(x3+x4)$

Q.9 a) What are the important selection factors for ADCs and DAC [8]

b) Explain Pin diagram of 8085. [8]

OR

Q.10 a) What is meant by PI control? Explain with the help of a diagram the working of PI control used in machine tools. [8]

b) Write short notes on: [8]

i) Linear feedback control system ii) adaptive control system

Q.11 a) Describe the flexibility concept and .different approaches of Flexibility in FMS [10]

b) Explain the characteristics of continuous and intermittent transfer systems and their applications. [8]

OR

Q.12 Short notes on **any three** [18]

1. Vibratory bowl feeders 2. Synchronous material transfer
3. Automated warehouse. 4. Low cost automation

UNIVERSITY OF PUNE

[4364]-483

B. E. (Production Eng) Examination Operations Research

(2008 Course) (411083)

[Total No. of Questions:12] **[Total No. of Printed pages :9]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Attempt one question from question 1 or 2;3 or 4; and 5 or 6 from section I

(2) Attempt one question from question 7 or 8;9 or 10; and 11 or 12 from section II

(3) State assumptions clearly

(4) Use of Normal Distribution Probability tables are permitted

UNIT I

Q.1 A) Solve by Simplex method: [10]

Maximize: Z=	$3X_1$	+	$9X_2$	
	$1X_1$	+	$4X_2$	≤ 90
	$1X_1$	+	$2X_2$	≤ 50
	X_1	,	X_2	≥ 0

B) Dadabhai and Sons have two flour mills, one at Pune and another [7]

at Ahmednagar. Mill's production capacity is given in the table.

Plant	Capacity per day (tones)			Cost of running the plant per day (Rs)
	wheat	Maize	Bajari	
Pune	4	1	5	1500
Ahmednagar	10	1	3	1000
Requirement (tones)	40	8	30	

How many days per week should each mill be operated in ordered to meet the contract quantity by minimizing the cost of running.

(Only formulate LPP. Do not solve it)

OR

Q.2 A) Solve the LPP. (Don't use Graphical method): [10]

Minimize: Z =	$40X_1$	+	$24X_2$	
	$20X_1$	+	$50X_2$	≥ 4800
	$80X_1$	+	$50X_2$	≥ 7200
	X_1	,	X_2	≥ 0

B) How sensitivity analysis is carried for LPP? Discuss in brief. [7]

UNIT II

Q.3 A) Discuss Hungarian method. [6]

B) A company has three F1, F2 and F_3 and goods are supplied to 4 different [10]

cities D1, D2, D3 and D4. The table shows per unit cost of transportation. The Supply capacities and demand are as shown in the table.

Factories	Consumptions centers				**Capacity**
	D1	D2	D3	D4	
F1	4	6	8	8	40
F2	6	8	6	8	60
F3	5	7	6	8	50
Demand	**50**	**30**	**50**	**50**	

Find the optimal solution.

OR

Q.4 A) Following table represents cost projects (lakhs) for particular bidder. [10]

Find out optimal assignment and total costs of the projects

Bidders	Projects			
	I	II	III	**VI**
A	20	60	95	120
B	11	41	82	108
C	6	33	50	71
D	5	8	15	26

B) Discuss degeneracy in Transportation problem. [6]

UNIT III

Q.5 A) What is 0-1 programming ? How problems are formulated? [6]

State applications.

B) A 4 ton vessel can be loaded with one or more of the three items. The [10]

following table gives the unit weight, w_i in tons and the unit revenue in thousands of dollars, r_i, for the item 'i'. How should the vessel be loaded so as to maximize the revenue?

	Item	Weight per unit	Revenue Per unit	
	i	w_i	r_i	
	1	2	31	
	2	3	47	
	3	1	14	

OR

Q.6 A) Discuss Geometric programming and its applications [5]

B) Discuss Cutting plane algorithm for IP [5]

C) Discuss state and stage as used in Dynamic programming. What is return function? [6]

SECTION II

UNIT IV

Q.7 A) The flee owner finds from his past record, that the cost per year of an auto whose purchase price Rs. 60 000 is given below: [10]

Year	1	2	3	4	5	6	7	8
Maintenance	10000	12000	14000	18000	23000	28000	34000	40000
Salvage	30000	15000	7500	3750	2000	2000	2000	2000

What is the optimum replacement plan

B) Discuss Minimax and Maximin rule with saddle point. [6]

OR

Q.8 A) Discuss individual and group replacement policies. [6]

B) Solve the game:

Strategies	Player B		
	b1	b2	b3
Player A	a1	20	25
	a2	6	10
	a3	40	18

UNIT V

Q.9 A) The annual demand for an item is 3200 units. The unit cost is Rs. 6. [10]

The inventory carrying cost is 25% per annum per unit. The cost of one procurement is Rs. 150. Determine

a) EOQ

b) Number of orders per year

c) Time between two consecutive orders

d) Total annual cost.

B) Discuss Minimum Cost Service rate (MCSR) [6]

OR

Q.10 A) Arrival rate of the customers at the banking counter follows [10]

Poisson distribution with mean 30 per hour. The service rate of the counter also follows Poisson distribution with mean of 40 per hour. Find

1. Probability of having zero customers in the system

2. Probability of having 2 customers in the system

3. Probability that customer have to wait for 15 minutes in queue

4. Mean customers in queue

5. Average waiting time in queue

B) Discuss ABC analysis and its uses. [6]

UNIT VI

Q11 Network IP table is given below.

Activity	Description	Time	Preceding activity
A	Organize sales office	6	-
B	Hire salesman	4	A
C	Train salesman	7	B
D	Select advertising agency	2	A
E	Plan advertising alcampaign	4	D
F	Conduct campaign	10	E
G	Design package	2	-
H	Set up packing facilities	10	G
I	Packing initial stocks	6	H,J

J	Place order with manufacturer	13	-
K	Select distributors	9	A
L	Sell to distributors	3	C,K
M	Transport the stock	5	I,L

1. draw AOA or AON network [5]
2. how long is the project duration? [4]
3. Tabulate Early Start schedule and Late start schedule times [5]
4. tabulate Total floats, free floats, and Independent floats for all non critical activities [4]

OR

Q12 a) Network is given below with three time estimates in weeks.

Act	A	B	C	D	E	F	G	H	I	J	K
IP	-	-	-	A	A,B	C	C	E,F	E,F	D,H	I,G
O*	6	1	1	1	1	1	2	4	4	2	2
M**	7	2	4	2	2	5	2	4	4	5	2
P***	8	9	7	3	9	9	8	4	10	14	8

O*- Optimistic time estimate, p***. Pessimistic time estimate,

m**- most likely time estimate

1. draw the network and find critical activities and critical path [3]
2. find expected times and various for tasks [4]
3. how much is expected project duration? [2]

4. Find probability that project takes more than 25 weeks. [2]

5. Find probability that project is completed in 19 days [2]

6. find the expected project duration for 90% confidence level. [2]

b) State different types of floats and discuss any one. [3]

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *3*]

UNIVERSITY OF PUNE
[4364]-484-507
B. E. (Production/production(s/w)]) Examination - 2013
Plastic Engineering
(2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1. ***Answer*** *three questions from section I and three questions from section II.*
2. *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Explain polymerization process in brief.	[9]
	B	Explain coloring of plastic	[9]
		OR	
Q.2	A	Discuss commonly used addictives in plastics	[9]
	B	Explain with neat diagram organic structure of plastic.	[9]
Q.3	A	Explain different special features of extruded die	[8]
	B	Explain coating and lamination process in extrusion	[8]
		OR	
Q. 4	A	Mention different problems which may raise during extrusion process and also state redemies to them.	[8]
	B	Describe twin srew extruder in brief with neat sketch.	[8]
Q. 5	A	Mention different design parameters which need to be	[8]

		consider while designing mould for injection molding?	
	B	Explain injection moulding cycle in brief	[8]
		OR	
Q. 6	A	Mention different mechanical properties which may get affected during injection moulding process and justify them.	[8]
	B	Explain in brief injection moulding process with neat diagram.	[8]
		SECTION II	
Q. 7	A	Compare injection blow and extrusion blow molding processes.	[9]
	B	Mention different materials which can be used for blow moulding and also mention different design parameters which need to be consider.	[9]
		OR	
Q. 8	A	Explain stretch blow moulding process in brief.	[9]
	B	What are the different types of blow moulding process explain any one in brief.	[9]
Q. 9	A	Mention different problems which may raise during thermoforming process and also mention remedies to those problems.	[8]
	B	State and explain the process parameter which need to be consider for thermoforming process	[8]
		OR	
Q. 10	A	Explain twin sheet thermoforming process in brief.	[8]
	B	Explain vaccum forming with neat sketch	[8]

Q. 11	A	State different machining process of plastic and explain any one in brief.	[8]
	B	Explain polishing & buffing process for thermoplastic materials.	[8]

OR

Q. 12	A	Explain trimming and routing of thermoselling materials	[8]
	B	Explain tumbling & Ashing process in brief.	[8]

University of Pune
Examination May 2013

BE PRODUCTION (2008 COURSE) 4364 – 485

INDUSTRIAL ROBOTICS

Time – 3 Hrs. Max.Marks-100

Instructions-

1. Attempt three question from each unit in section I and section II
2. Answer to the sections should be written on separate answer books
3. Figures to the right indicate full marks
4. Assume suitable data, if necessary

Section I

Q1.a) What is the basic structure of Industrial Robot? What are the advantages of this structure for its application. **[8]**

b) Explain the six degrees of freedom associated with the manipulator. **[8]**

OR

Q2. a) Explain the classification of Robots on the basis of following terms: **[8]**

i) Configuration
ii) Drive
iii) Motion Control

b) Explain the following terms: **[8]**

i) Speed of motion
ii) Load carrying capacity
iii) Speed of response
iv) Compliance

Q3. a) For a pick and place type robot, the link parameters table is given below:

i	**α_{i-1}**	**a_{i-1}**	**d_i**	**θ_I (°)**
1	**0**	**0**	**2**	**0**
2	**-90**	**0**	**0**	**30**
3	**0**	**5**	**2**	**90**

Determine the location of end point of the link 3 w.r.t base. **[8]**

b) Explain the forward kinematics associated with planar 3R manipulator. [8]

OR

Q4) a) For the pick and place type of robot, the gripper is initially at location (60, 50, 80) and the following movements are in sequence. **[8]**

i) Rotation about x-axis by 90°.
ii) Translation along z by 30 units. Find the position of gripper with respect to the original system by using transformation matrix method.

b) Explain the Inverse kinematics associated with planar 3R manipulator. **[8]**.

OR

Q5. a) Describe force and torque sensor used in Robot. **[8]**

b) Explain the concept of low vision and high vision associated with Robot vision system. **[10]**

Q6. a) With neat sketch explain any two electromechanically actuated Grippers. **[8]**

b) The following data represent 8X8 array of pixel. Each element in array indicates the grey level of pixel. Convert it into white image. **[10]**

10	17	19	17	19	17	19	12
13	17	19	18	19	19	18	13
14	15	11	19	19	15	10	14
13	10	11	2	20	11	11	13
12	12	12	2	21	12	11	12
11	12	12	19	19	12	10	12
12	18	18	18	19	18	20	11
12	19	19	18	19	20	22	12

Section II

Q7. a) Explain the lead through programming method used in Robots. **[8]**

b) Explain 'WAIT, DELAY, SIGNAL, DEPART commands. **[8]**

OR

Q8. a) Explain intelligence can be incorporated in robots. **[8]**

b) Describe the structure of robot programming language with example. **[8]**

Q9. a) What is handshaking? Explain hardware handshaking of robot. **[8]**

b) With neat sketch explain interfacing of robot with PC. **[8]**

OR

Q10. a) What do you understand from robot economics? **[8]**

b) Describe the following applications of Robot. **[8]**

i) Arc welding

ii) Machine loading and unloading.

Q11. Write notes on

a) telerobots. **[9]**

b) Walking robots. **[9]**

OR

Q12. Write notes on

a) Underwater Robot. **[9]**

b) Robot used in mines. **[9]**

University of Pune
B.E. (Production Engg)
4364-488
Examination May 2013
Ergonomics and Human Factors in Engineering
(2008 Pattern)

Total No. of Questions : 12 **[Total No. of Printed Pages :3]**

[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

*(1) Answer **03 question from each section.***
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Figures to the right indicate full marks.
(4) Use of logarithmic tables, slide rule, Mollier charts, Electronic packet calculator is allowed.
(5) Neat diagrams must be drawn whenever necessary.
(6) Assume suitable data, if necessary.

SECTION I

Unit I

Q1. A) What are the objectives of "Human Factors Engineering"? [6]
B) Explain features of human body & explain measures of physiological functions. [6]
C) Explain Design of MMH Task. [6]

OR

Q2. A) What are Human Machine systems? Explain its types. [6]
B) Explain performance criteria for physical activity. [6]
C) Explain various types of movements of human body members. [6]

Unit II

Q3. A) What is Anthropometry and explain principles used in application of anthropometric data. [8]

B) Explain use of anthropometric data in designing of interior of a passenger car of capacity four persons. [8]

OR

Q4. A) Explain the considerations in designing a Seated workplace. [8]

B) Explain principles of arrangement of components in various working conditions. [8]

Unit III

Q5. Write a short note on (any two) [16]

1. Hand tool design
2. Functions of controls
3. Concept of visibility
4. Location of controls in work place

OR

Q6. A) Explain arrangement of following components at work place (any Four) [16]

1. Visual displays
2. Control on panels
3. Hand controls
4. Two hand controls
5. Foot controls
6. Controls that require force.

SECTION II

UNIT IV

Q7. A) What is wet Bulb Globe Temperature? How do you calculate it? Explain its utility in hot humid conditions. [9]

B) Explain the physiological effects of heat & cold. Explain its remedies. [9]

OR

Q8. A) Explain the system of measurement of light. Also explain use of lamps & luminaries. [9]

B) Explain Discomfort glare & Disability glare. [9]

UNIT V

Q9. A) Explain effect of following conditions on energy expenditure. [16]

1. Extreme Heat

2. Extreme cold
3. Extreme humidity

Also explain measures to overcome effects of these environmental conditions.

Q10. A) Explain in detail Requirement of rest allowances in work and correlate it with energy expenditure. [8]

B) How manual material handling capacity is determined considering various factors? [8]

UNIT VI

Q11. A) Explain the term Accident. Explain its relationship with human errors. [8]

B) Explain perception of risk & describe risk evaluation process. [8]

OR

Q12. A) What are the characteristics of system design?
How human factors are applied in system design? [12]

B) Explain the significance of ergonomic safety. [4]

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4364]-489
B. E. (*Production*) Examination - 2013
Materials & Logistic Management
(Elective-II)(2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

Instructions:

1. *Answer **three** questions from section I and **three** questions from section II.*
2. *Answer **Q1 or Q2, Q3 or Q4, Q5 or Q6** from section I and **Q7or Q8, Q9 or Q10, Q11 or Q12** from section II.*
3. *Answers to the **two sections** should be written in **separate answer-books**.*
4. *Neat diagrams must be drawn wherever necessary.*
5. *Assume suitable data, if necessary.*
6. *Use of logarithmic tables, slide rule, electronics pocket calculator is allowed*
7. *Black figures to the right indicate **full marks**.*

SECTION –I

Q.1	A	Explain the importance management in manufacturing organisation.	9
	B	Explain factors influencing make or buy decision	9
		OR	
Q.2	A	Define value analysis and explain FAST diagram in detail.	9
	B	Explain the inputs and outputs of detail.	9
Q.3	A	Explain 5R's in detail.	8
	B	Explain i) Bill of lading ii) Letter of credit	8
		OR	
Q.4	A	Explain relationship of purchase department with sales and production department	8
	B	Explain vendor development & vendor Rating.	8
Q.5	A	Explain the methods of issuing of materials in brief.	8
	B	Explain in detail various steps involved in waste management	8

OR

Q.6	A	Explain functions of stores department. What are the different factors to be considered for optimum stores layout.	8
	B	Explain and differentiate between i. Centralized and Decentralized store ii. Annual stock taking and continuous stock taking.	8

SECTION II

Q.7	A	What are the functional areas of Logistics	8
	B	Explain the various factors to be considered in warehouse design	8

OR

Q.8	A	Explain transportation management strategy	8
	B	Explain different components of logistics management	8
Q.9	A	Explain different drivers of S.C.M	8
	B	Discuss supply chain revolution and its implications on managing business	8

OR

Q.10	A	Explain different risks in S.C.M	8
	B	Define Supply Chain. State importance of SCM in industries	8
Q.11	A	Explain various costs associated with inventory decision in detail	9
	B	Following information in an inventory is available Annual Demand=2400 Units, Unit Price=Rs.2.40, Ordering Cost=Rs 4, Storage Cost=Rs 2% Per Year, Interest Rate=10% Per Annum, Lead Time=1/2 Month (15days). If safety stock is 50 units. Calculate EOQ, Re-order level, maximum stock, minimum stock, total inventory cost including material cost	9

OR

Q.12	A	Differentiate between Fixed order Quantity system and Fixed Order Interval system	9
	B	Derive the formula for EMQ when replenishment is non instantaneous (Grodual). State the assumptions mode.	9

UNIVERSITY OF PUNE

[4364]-491

B. E. (Production) Examination - 2013
PLANT ENGINEERING AND MAINTENANCE-Elective-II
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
Total No. of Questions : 12 **[Total No. of Printed Pages :2]**

Instructions :

*(1) Answer **any three** questions from each section.*
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Assume suitable data, if necessary.

SECTION I

Q1) a) Explain work routine maintenance systems? [8]

b) Discuss preventive maintenance in detail? [8]

OR

Q2) a) Explain step to be followed in assessment of maintenance Management? [8]

b) Explain importance of safety in maintenance? [8]

Q3) a) Explain importance of plant facility in manufacturing industries? [8]

b) Explain the criteria's for plant layout is selection? [8]

OR

Q4) a) Explain Muther's plant layout procedure? [8]

b) Discuss Group technology aspect in plant layout? [8]

Q5) a) What is condition based maintenance? Explain in detail? [10]

b) Explain MICLASS for material classification? [8]

OR

Q6) a) Explain use of simulation and software in spare part management [10]

b) Write short note on use of simulation in inventory planning. [8]

SECTION II

Q7) a) Explain the scheduling maintenance for manufacturing industries? [8]

b) Explain mathematical model for calculating life cycle cost? [8]

OR

Q8) a) Explain rigorous model for calculating life cycle cost? [8]

b) Discuss role of periodic maintenance in any engineering company? [8]

Q9) a) Discuss importance of safety in the manufacturing industry. [8]

b) Write short note on energy in plants. [8]

OR

Q10) a) Explain accident preventive practice and codes. [8]

b) Write short note on, limiting norms of pollution in the waste disposal. [8]

Q11) a) Explain the condition base maintenance with aid of vibration signature? [10]

b) Discuss use of fluorescent dye related to maintenance. [8]

OR

Q12) a) Explain any one advance technique in the maintenance of machine tool? [10]

b) Compare traditional maintenance with TPM. [8]

UNIVERSITY OF PUNE
[4364]-492
B. E. (PRODUCTION ENGINEERING) Examination - 2013
COMPUTER INTEGRATED DESIGN AND MANUFACTUREING
(2008 Pattern)

[Total No. of Questions: 12] **[Total No. of Printed Pages :4]**
[Time : 3 Hours] **[Max. Marks : 100]**

Instructions :

(1) Answer any three questions from each section.
*(2) Answers to the **two sections** should be written in **separate answer-books**.*
(3) Black figures to the right indicate full marks.
(4) Neat diagrams must be drawn wherever necessary.
(5) Use of logarithmic tables, slide rule, Mollier charts, electronics pocket calculator is allowed.
(6) Assume suitable data, if necessary.

SECTION I

Q1 A) What is inverse transformation? Obtain the inverse transformation matrix for the following operations. [6]
a) Translation b)Rotation c)Scaling

B) Find concatenated matrix if the operations are performed as per The sequence given below, [10]
a) Rotation through 60^0 anticlockwise @ orign
b) Translation through 6 and -8 units along the x and y directions.
c) Rotation through 30^0 clockwise @ origin

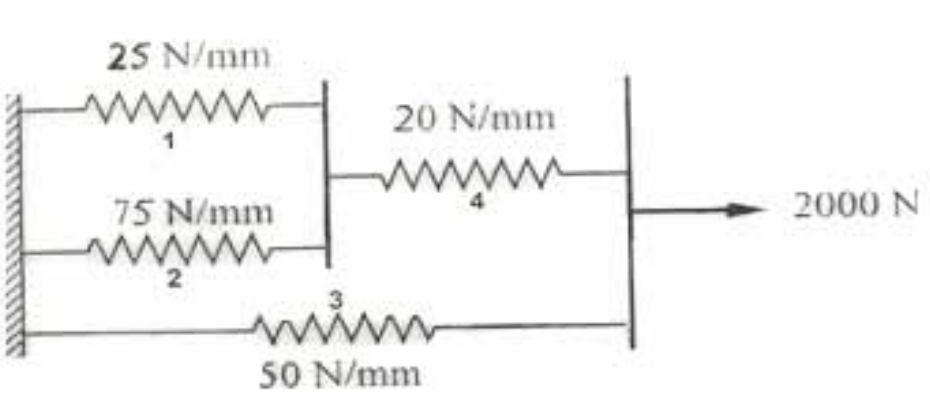
OR

Q2 A) What is mapping of geometric models? Explain with neat sketch following three dimensional mapping. [6]
a) Translational mapping b) Rotational mapping c) General mapping

B) A triangle ABC is represented as A(15,15), B(70,15) and C(40,60). If it is mirrored about a line y=30. Determine the new Coordinates of the triangle and represent the transformation with neat sketch. [10]

Q3 A) Describe various steps in Finite Element Analysis. [8]

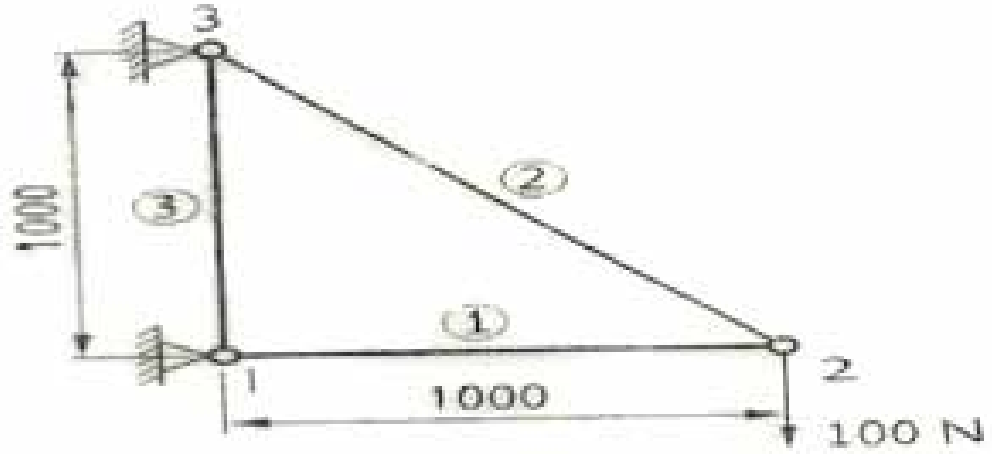
B) Fig. 1shows the cluster of four springs. Calculate deflection of Each spring when a force of 2000 N is applied. Model the spring as 1D spar element [10]



OR [6]

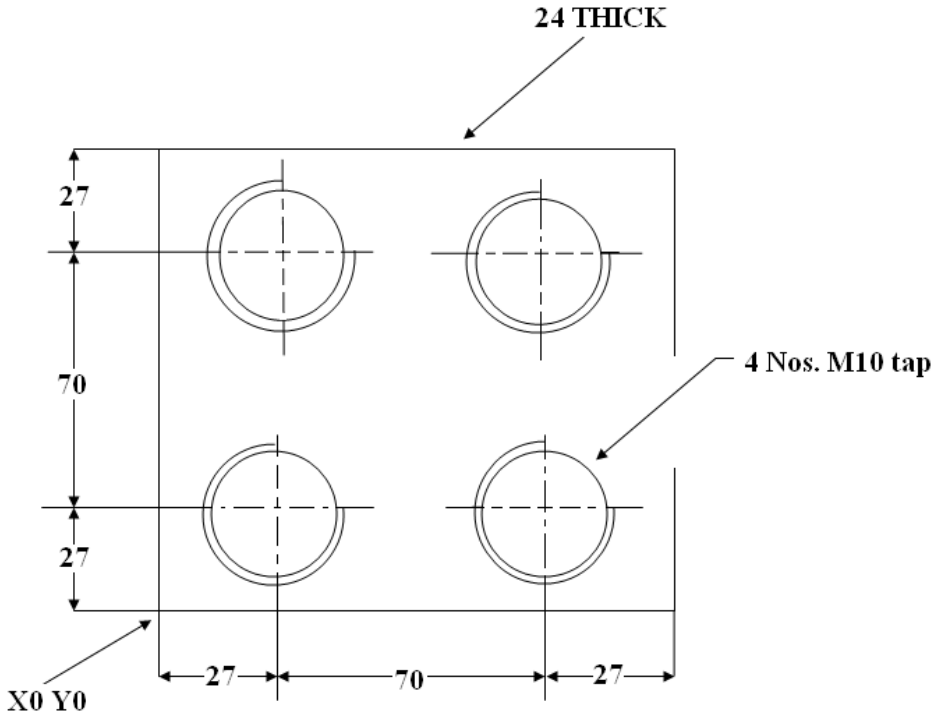
Q4 A) State and explain various types of elements used in the Finite Element Analysis.

B) Fig. 2 shows truss consisting of three elements whose AE/L value is 2000 N/mm. calculate the deflection at node 2 [12]



Q.5 A) What is canned cycle? Explain with neat sketch canned cycles for drilling and tapping. [6]

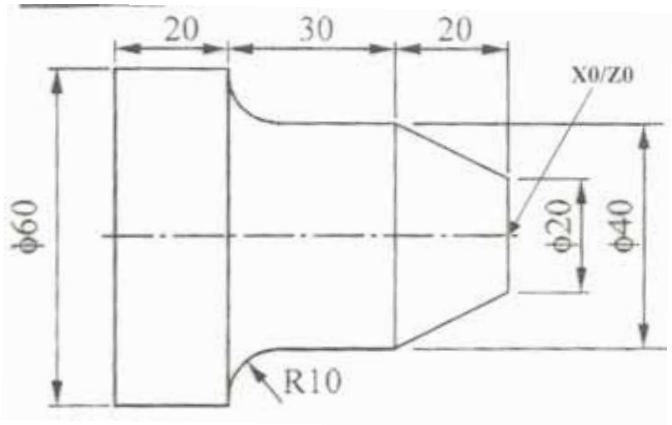
B) Write a CNC program using G and M codes for tapping four holes as shown in the fig 3, use canned drilling and tapping cycle. [10]



OR

Q.6 A) Write short note on word address format [6]

B) Write a program using G and M codes to machine the component as shown in fig.4 Assume the speed as 500 rpm and feed rate of 0.35 mm/revolution. [10]



SECTION II

Q.7 A) What is concurrent engineering? Discuss various difficulties encountered in carrying out concurrent engineering. [8]

B) Write short note on computer aided inspection and quality control. [8]

OR

Q.8 A) Discuss MRP I & II in modern manufacturing system with sketch. [8]

B) Write short note on methods of programming the robot. [8]

Q.9 A) What is flexible manufacturing system (FMS)? Explain the classification of FMS based on a) Number of Machines and b) Level of flexibility c) Types of layout [12]

B) Write a note on Petrinets. [6]

OR

Q.10 A) Explain Rank Order Clustering (ROC) algorithm for grouping Parts and machines [8]

B) Determine most logical sequence for data according to. From/To ratio. Construct flow diagram, develop a feasible layout for cell where the part enter and exists the cell. [10]

	TO					
From	1	2	3	4	5	6
1	0	20	60	0	0	0
2	0	0	15	10	0	20
3	0	0	0	0	0	0
4	70	0	10	0	0	0
5	40	0	15	20	0	0
6	0	10	0	0	0	0

Q.11 A) Explain with neat sketch IBM concept of CIM [8]

B) Explain with neat sketch solid ground curing process. [8]

OR

Q.12 A) Explain with neat sketch the Siemens Model of CIM. [8]

B) Explain with neat sketch steriolithography with its advantages and disadvantages. [8]

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4364]-494
B. E. (Production) Examination - 2013
Automobile Engineering(Elective-III) (2008 Course)

[Time: *3* Hours] **[Max. Marks: 100]**

SECTION –I
Unit-I

Q.1	A	Explain in detail how to classify the automobiles?	8
	B	Differentiate between integral and semi-integral frame.	8
	C	What is the function of injector?	2

OR

Q.2	A	Discuss the classification of petrol injection system.	8
	B	Describe the working of two stroke petrol engine with neat diagrams.	8
	C	What do you understand by frameless frame?	2

Unit-II

Q. 3	A	What are the effects of over heating of engine parts?	6
	B	What is the function of a thermostat?	6
	C	List out the different types of additives used.	4

OR

Q. 4	A	Explain briefly the construction and working of a water type of oil cooler.	8
	B	What is thermosyphon cooling? Explain.	8

Unit-III

Q. 5	A	Explain Magneto ignition system.	6
	B	What is the significance of SAE viscosity ratings?	3
	C	What are the various types of lubricants?	7

OR

Q. 6	A	What are oil additives and what its functions?	8
	B	What are the advantages and disadvantages of Battery ignition system?	8

SECTION II
Unit-IV

Q. 7	A	Explain the construction and working of multiple disc clutch with the help of diagram.	10
	B	What is the necessity of differential in an automobile?	8

OR

Q. 8	A	Illustrate the construction and working of single plate clutch?	10
	B	What is clutch? What characteristics an automobile clutch should possess?	6
	C	What do-you mean by differential?	2

Unit-V

Q. 9	A	What do you understand from the terms i. Oversteer ii. Underteer iii. Cornering power iv. Slip angle v. Camber	10
	B	Write short note on shock absorber	6
		OR	
Q. 10	A	What are the advantages and disadvantages of rubber spring?	8
	B	What are the various components of steering system?	8
Q. 11	A	Write short notes on i. Air Brakes ii. Electrical Brake	10
	B	Write the functions of brakes in an automobile	6
		OR	
Q. 12	A	What are the general maintenance tips?	8
	B	Give the troubleshooting chart for Clutch with its complaint, cause and remedy	8

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-495
B. E. (Production) Sem II Examination - 2013
MECHATRONICS (Elective III) (2008 Course)
[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answer three question from each section.*
2 *Answers to the two sections should be written in separate answer-books.*
3 *Neat diagrams must be drawn wherever necessary.*
4 *Assume suitable data wherever necessary but mention it clearly.*
5 *Use of Scientific Calculator is allowed.*

SECTION -I

Q.1	A	Explain why PLC's are superior than other types of controllers.	8
	B	Explain with neat sketches any two programming device in PLC's	8
		OR	
Q.2	A	Describe with neat sketch the functions of the CPU in PLC	8
	B	What are areas of PLC applications? Explain any four in detail.	8
Q. 3	A	Explain with neat sketches memory types in PLC controllers	8
	B	What are remote I/O systems? Explain with neat sketches daisy chain, star, and multi-drop configurations.	8
		OR	
Q. 4	A	Multi-bit register/BCD output interfaces provide parallel communication between the processor and an output device, explain with neat sketch.	8
	B	Explain in brief the electrical specifications in the PLCs.	8
Q. 5	A	Explain with neat sketch transformation of analog signal into discrete form.	8
	B	Explain with neat sketch analog input data handling.	10
		OR	
Q. 6	A	Explain with neat sketch analog output data handling.	8
	B	A programmable controller uses a bipolar – 10 to + 10 VDC signal to control the flow of material being pumped into a reactor vessel. The flow control valve has a range of opening from 0 to 100% to allow the chemical	10

ingredient to flow into the reactor tank. The processor computes the required flow (the percentage of valve opening) through a predefined algorithm. Analog flow meters send feedback information to the processor about other chemical being mixed. A register stores the computed value for percentage opening, ranging from 0000 to 9999 BCD (0 to 99.99%).

i) Find the equation of the line defining the relationship between the analog output signal (in counts) and the analog output transformation from -4095 to +4095 counts. The module has a 12-bit resolution and includes a sign bit as a function of voltage output and percentage opening.

ii) Illustrate the relationship of outputs in counts to the computed percentage opening as stored in the PLC register (0000 to 9999). Also, find the equation that describe the relationship between the required counts and the available calculated value stored in the register.

SECTION II

Q. 7	A	With neat diagram explain the direct action I/O interface and intelligent I/O interface.	8
	B	With a connection diagram explain the working principle of thermocouple.	8
		OR	
Q. 8	A	With neat diagram explain any TWO types of special discrete interfaces.	8
	B	With a connection diagram explain the working principle of Resistance Temperature Detector (RTD).	8
Q. 9	A	Write any four ladder relay instructions with associated symbol and functions	8
	B	Construct the ladder program for the following digital equations. Q1 =(I1 + Q1).$\overline{Q2}$ Q2 = I2 Q3 = Q1. (I3 + Q3). $\overline{I4}$ Q4 = Q1. (I4 + Q4) . I3	8
		OR	
Q. 10	A	With a suitable illustration explain the Boolean language used in PLC to program a controller.	8
	B	Implement the equivalent ladder rung logic shown in Figure 1, using a NOT output coil instruction.	8

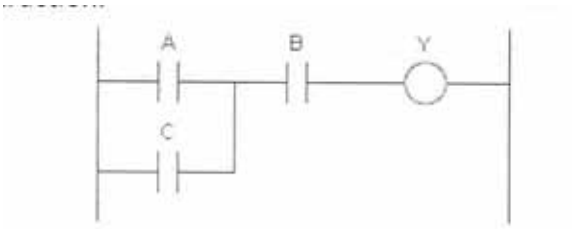


Figure 1

Q. 11 A Explain in brief RTD with respect to principle, construction, applications. 8

B For the voltage-sensitive circuit shown in Figure 2, find 10

i) The equation that describes the voltage differential measurement between point A and point B and

ii) The bridge resistance ratio when the voltage differential is 0 (balanced state.)

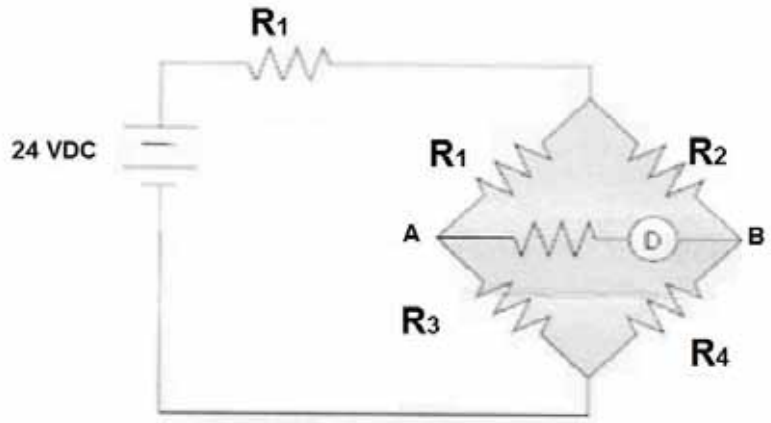


Figure 2

OR

Q. 12 A Explain the types of measurement errors with respect to the possible causes and methods of prevention/reduction. 9

B With a neat diagram, explain the working principle of linear variable differential transformer (LVDT). 9

[Total No. of Questions: 12] **[Total No. of Printed Pages: 2]**

UNIVERSITY OF PUNE
[4364]-496
B. E. (Production Engineering) Examination - 2013
METAL WORKING TRIBOLOGY
(2008 Course)(411089)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1. *Answers to the two sections should be written in separate answer-books.*
2. *Black figures to the right indicate full marks.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
5. *Assume suitable data, if necessary.*
6. *Answer three question from each section*

SECTION -I

Q.1	A	Explain the basic processes involved in characterization of a surface	10
	B	Differentiate between 2D and 3D surface topography parameters and explain with mathematical expressions R_a, R_{sk}, R_{ku} parameters.	8
Q.2	A	Explain the methods of measuring dynamic coefficient of friction	8
	B	Derive a modified Bowden and Tabor friction equation.	8
Q. 3	A	Explain the 2 body and 3 body mechanism of wear.	8
	B	With a neat diagram explain the stick slip phenomenon observed in dry sliding contact	8
Q. 4	A	What is the fundamental mechanism of erosive wear? Explain with neat sketches.	8
	B	Explain with a schematic diagram working of a typical Mechanical face seal.	8
Q. 5		Write short notes on (4marks each) a) Parameters affecting wear and friction b) Material loss by in adhesive wear c) Lubrication used for wire drawing	16

d) Ergodicity and Stationarity of a surface
e) Friction measurement using pin-on-disk method.

Q. 6	A	Explain the characteristics of the Lubricant which reduce friction.	8
	B	Distinguish between Dry friction, Boundary friction and semi liquid friction.	8

SECTION II

Q. 7	A	Derive the expression for load carrying capacity and frictional coefficient for conical hydrostatic bearing.	10
	B	Explain how the lubricant film thickness and bearing stiffness is controlled in hydrostatic bearings.	8
Q. 8	A	Explain the assumptions used while deriving Reynold's equations in hydrodynamic theory.	8
	B	What is a finite bearing. How are operational parameters like pressure, load capacity. Etc. determined for finite bearings.	8
Q. 9	A	Derive the modified reynold's equation for Elasto-hydrodynamic lubrication.	8
	B	Derive squeeze film equation for rectangular plate approaching a rigid surface.	8
Q. 10		Write short notes on (4marks each) 1. Application of squeeze film lubrication 2. Properties required in lubricants. 3. Variation of film thickenss in journal bearings. 4. Petroff' equation involving concentric bearing	16

[Total No. of Questions: *12*] **[Total No. of Printed Pages:** *2*]

UNIVERSITY OF PUNE

[4364]-498

B. E. (*Production***) Examination - 2013**

World Class Manufacturing (2008 Course)

[Time: *3* **Hours]** **[Max. Marks: 100]**

Instructions:

1 ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6 from Section I and Q7 or Q8, Q9 or Q10, Q11 or Q12 from Section II***

2 *Answers to the* ***two sections*** *should be written in* ***separate answer-books****.*

3 *Black figures to the right indicate full marks.*

4 *Neat diagrams must be drawn wherever necessary.*

5 *Assume suitable data, if necessary.*

SECTION -I

Q.1	A	Explain the hall's frame work of World Class Manufacturing?	08
	B	Discuss the Gunn's' model of World Class Manufacturing?	08
		OR	
Q.2	A	Explain in brief the evolution of World Class Manufacturing?	08
	B	Discuss Manufacturing Excellence WCM?	08
Q. 3	A	Explain manufacturing challenges through value added manufacturing?	08
	B	Compare emerging business trends in information age with industrial age with industrial age.	08
		OR	
Q. 4	A	Explain seven wastages in manufacturing and how they	08

		are eliminated?	
	B	Explain any two best practices of Toyoto Production System?	08
Q. 5	A	Discuss 5S in detail from manufacturing systems?	10
	B	How the procurement & store practices are different in WCM from traditional manufacturing?	08
		OR	
Q. 6	A	Explain lean manufacturing system in detail?	10
	B	Discus visual control from WCM?	08

SECTION II

Q. 7	A	Explain techniques of problem solving in WCM?	08
	B	Explain organization structure of lean system?	08
		OR	
Q. 8	A	How WCM organization employees are different from traditional manufacturing Employees?	08
	B	How human resource used as problem solver in WCM organization?	08
Q. 9	A	What is necessity of modern performance measurement?	08
	B	Write short note on PO-P system of world class performance?	08
		OR	
Q. 10	A	How the AMBITE system measure the performance?	08
	B	Discuss the steps of the TOPP system of performance measurement?	08
Q. 11	A	Discuss case study related to any one MNC of WCM.	10
	B	Explain clean manufacturing systems.	08
		OR	
Q. 12	A	Discuss necessity of green manufacturing in today's manufacturing era?	10
	B	Write short note on agile manufacturing	08

[Total No. of Questions: 12] **[Total No. of Printed Pages: 3]**

UNIVERSITY OF PUNE
[4364]-499
B. E. (PRODUCTION ENGINEERING) Examination - 2013
INTELLIGENT MANUFACTURING SYSTEMS
(ELECTIVE IV) (411090)
(2008 Course)

[Time: 3 Hours] **[Max. Marks: 100]**

Instructions:

1 *Answers to the two sections should be written in separate answer-books.*
2 *Black figures to the right indicate full marks.*
3 *Neat diagrams must be drawn wherever necessary.*
4 *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*
5 *Assume suitable data, if necessary.*
6 *Answer any three questions from Section I and any three questions from Section II*

SECTION -I

Q.1 A) Define CIM and its components. Explain how it can be implemented in the automation of the production organization. [8]

B) Discuss the role of CAD/CAM system in the manufacturing facility. Describe briefly the CAM cycle in a feature - based design environment. [8]

OR

Q.2 A) Define the term "feature." Classify the manufacturing features. What are the advantages of feature- based modeling in manufacturing applications? [8]

B) What is the purpose of process planning? Why is Computer Aided Process Planning (CAPP) useful in manufacturing? Discuss some of the benefits of CAPP. [8]

Q. 3 A) Develop a taxonomy of the pioneering works in artificial intelligence and expert systems? [8]

B) Discuss briefly on „Computationally Intelligent Systems'. Explain different building blocks of computationally Intelligent Systems. [8]

OR

Q. 4 A) Define „Artificial Intelligence'? List with reason the ten most important manufacturing problems suitable for expert system applications? [8]

	B)	Discuss the difference between „Knowledge' and „ignorance' with respect to artificial intelligence applications. Dose having "knowledge" imply having "intelligence".	[8]
Q. 5	A)	Discuss the basic differences between a knowledge base and a data base? Why is the user interface an important consideration in expert system?	[9]
	B)	Develop an integrative solution model that links abstraction, construction and validation requirements of an expert system problem	[9]
		OR	
Q. 6	A)	Discuss the difference between declarative knowledge and procedural knowledge. Outline how a knowledge engineer acquire declarative knowledge and procedural knowledge.	[9]
	B)	Explain the following with an example i) Inductive and deductive reasoning ii) Breadth – First search iii) Depth – First search	[9]

SECTION II

Q. 7	A)	What is „Machine Learning'? Explain with an example how Neural Networks are useful in Machine Learning?	[8]
	B)	What is conceptual learning? List and characterize the basic concept learning strategies.	[8]
		OR	
Q. 8	A)	What is an artificial neuron? Discuss the basic equation associated with a neuron?	[8]
	B)	Discuss the difference between "Representation" and " Learning" in neural networks. Explain in brief the computational complexity of learning	[8]
Q. 9	A)	What is knowledge Based Group Technology (KBGT)? Explain with a neat diagram the structure of KBGT?	[8]
	B)	Discuss in detail the classification and cluster analysis approaches to Group Technology?	[10]
		OR	
Q. 10	A)	What are the typical constraints in the group technology problem in automated manufacturing systems?	[8]
	B)	Consider the following machine – part incidence matrix. Determine mutually separable machine cells and part families using Rank Order Clustering Algorithm.	[10]

A =		Part Number								Machine Number
		1	2	3	4	5	6	7	8	
	1		1	1		1				
	2	1					1			
	3				1			1		
	4	1					1			
	5			1		1			1	
	6				1					
	7		1	1		1			1	

Q.11 A) Consider the following formation of an expert system team: [8]

Suggest how the rules of the various individuals can be coordinated to facilitate an effective end product.

Individual	Role
Domain expert	Source of knowledge
Knowledge Engineer	Channel for Knowledge transfer
Management	Source of resources
AI sponsor	Source of motivation
Systems personnel	Integration
Users	Supply of application

B) what are the organizational problems that can evolve from the rapid introduction of expert systems technology? [8]

OR

Q. 12 A) explain with examples the role of Artificial Intelligence in the following [16]

i) Process Planning

ii) facility Planning