UNIVERSITY OF PUNE

[4364]-146

T. E. Production Engineering

Examination - 2013

Machine Tool Engineering

(June 2008 Pattern)

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

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

Instructions:

(1) Attempt Q1 or Q2,Q3 or Q4, Q5 or Q6 from section 1 and Q7 or Q8, Q9 or Q10,Q11 or Q12 from section 2

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

(3) Figures to the right indicate full marks.

(4) Neat diagrams must be drawn wherever necessary.

SECTION-1

Q. 1. A) Discuss the various types of automates with their advantage. (8)

B) Explain with a neat diagram the bar feed mechanism for automats. (8)

OR

Q. 2. A) How does an automat differ from a Capstan Lathe? (8)

B) What is an automated production line? (8)

Q. 3.A) Discuss the type of DNS systems and describe the classification of CNC systems based on tool motion with neat sketches. (8)

B) Explain open loop system and closed loop system of numerical Control with suitable diagram. (8)

OR

Q. 4. A) Write a short note on type of drives used for NC machine tool Spindle. (8)

B) Explain steps in manufacturing a part on CNC system. (8)

Q. 5. A) What is material handling system and explain the principle of Material handling. (8)

B) What are the advantage of AGV over other material handling system and discuss various types of AGV. (10)

OR

Q. 6. A) What is meant by an automated storage and retrieval system and Explain the various types of AS/RS. (8)

B) Explain the issues related design of an AS/RS. (10)

SECTION-2

Q. 7. A) Explain in detail Electrochemical Machining process with sketch And also mention the advantage and application. (8)

B) What is Electron Beam Machining? Sketch its set- up and indicate Its main parts and explain principles of operation. (8)

OR

Q. 8. A) Explain the principle of Plasma Arc Machining with sketch and state its application . (8)

B) Describe a non conventional method to cut rubber, leather alike. Explain the principle of operation and features of such a machine. (8)

Q. 9. A) Briefly discuss the following NC motion control system. (8)

i. Point-to-Point

ii. Straight cut

iii. Contouring

B) Draw the block diagram of Adaptive control system and explain briefly. (8)

OR

Q. 10. A) What are all the steps involved in preventive maintenance why Preventive maintenance is better than reactive maintenance. (8)

B) What is reliability of a machine tool and explain its various components. (8)

Q. 11. A) Explain the process of gear manufacturing using Milling Machine. (8)

B) Describe the working principle of Gear Shaper machine with suitable (8)

OR

Q. 12. A) Why Gear Finishing is important? (8)

Explain the following process of gear finishing?

1) Burnishing 2) Shaving 3) Lapping 4) Griding

B) Describe the Sunderland method of gear Manufacturing with uuitable diagram. (10)

UNIVERSITY OF PUNE

[4363]-141

T. E. PRODUCTION [2008] Examination – 2013

METROLOGY AND MECHANICAL MEASUREMENTS

[2008 PATTERN]

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

[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, electronic pocket calculator and steam tables is allowed.

(6) Assume suitable data, if necessary.

Section –I

Q. 1 a] Differentiate between Line, End & Wavelength standard [6]

b] Sketch the set up and explain working principal of Angle Dekkor. [10]

OR

Q. 2 a] Explain scope and importance of metrology. [6]

b] State and explain constant deviation prism. [10]

Q. 3 a] Write a short notes on; [8]

I] Interchangeability.

II] Selective assembly.

b] A hole and shafting has the dimension 60H7m6. [10]

The multipliers are

Grade	6	7
Multiplier	10	16

The fundamental deviation for fit m is given by

FD=+[IT7-IT6]

Find: i] The class of fit. ii] Sketch the fit and show the actual dimensions.

OR

Q . 4 a] State and explain working principal of pneumatic comparator. [8]

b] Design a workshop type GO and NO GO ring gauge for inspection of 30f8 shaft. [10]

Use the following data with usual notation:

1. $i=0.45\sqrt[3]{D} + 0.001D$
2. The standard tolerance for grade IT8=25i.
3. Fundamental deviation for F shaft= $-5.5D^{0.41}$

Q .5 a] Explain with neat sketch working principal of Tomlinson surface recorder. [10]

b] Explain the use of Laser in metrology. [6]

OR

Q.6 a] Sketch and explain Gear tooth vernier caliper method for checking width and depth. [8]

b] Write a short notes on; [8]

I] Tool maker's microscope.

II] Floating carriage micrometer.

Section –II

Q.7 a] Define measurement and state the significance of measurement. [8]

b] Explain different types of calibration [10]

Q.8 a] Differentiate between Sensor and secondary Transducer. [10]

b] State and explain Resistance temperature detector. [8]

Q.9 a] Define temperature and explain different temperature scales. [8]

b] What is thermister ? Give characteristic of thermister. [8]

OR

Q.10 a] Explain with neat sketch construction and working of venturimeter. [8]

b] Explain with neat sketch construction and working of McLeod gauge [8]

Q.11 a] Write a short note no; mechanical type Tool dynamometer. [8]

b] Discuss basic methods of force measurements and explain maintenance replacement of measuring equipments. [8]

Q.12 a] State the importance of liquid level measurements [8]

b] State and explain various types of strain gauges. [8]

UNIVERSITY OF PUNE

[4363]-142

T. E. (Production Engg.) Examination-2013

KINEMATICS OF MANUFACTURING MACHINES

(2008 Course)

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

[Time : 4 Hours] **[Max. Marks : 100]**

Instructions :

(1)Attempt 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)Neat diagrams must be drawn wherever necessary.

(4)Assume suitable data, if necessary.

(5)Figures to right indicate full marks.

SECTION – I

Q1. a) Discuss type synthesis, number synthesis and dimensional synthesis. [8]

b) Derive expressions for displacement, velocity and acceleration analysis of slider crank mechanism. [8]

OR

Q2. a) Draw and explain the kinematic structure of Gear hobbing machine. [8]

b) In the four bar mechanism, the link AD is the fixed and the dimensions of the various links are as follows -

AB= 50 mm, BC= 200 mm, CD = 150 mm , AD = 205 mm

The crank AB has an angular velocity of 25.13 rad/sec in anticlockwise direction and retardation of 20 rad/sec^2 when the input link is inclined at an angle of 30^0. Determine :

(i) Angular displacement of link CD. (ii) Angular velocity of link CD and (iii) Angular acceleration of link CD . [8]

Q3. a) State and explain the law of gearing. [8]

b) An epicyclic gear consist of three gears A, B and C as shown in Fig. 1 internal gear A has 72 teeth, gear C has 32 teeth. The gear D gears with both A and C and is carried on arm which rotates about the center of A at 18 rpm. If the gear A is fixed, determine the speed of gears B and c. [10]

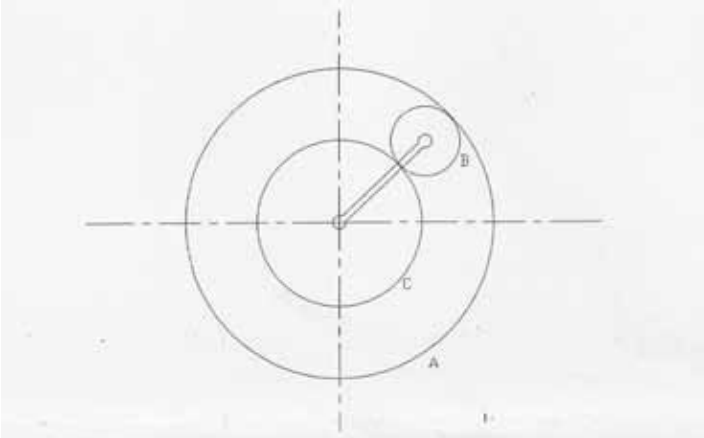


Fig.1

OR

Q4. a) Derive an expression for Minimum number of teeth to avoid interference on the pinion and the Wheel. [10]

b) The mating gears with module 6.5 mm have 19 and 47 teeth of 20^0 pressure angle and standard addenda and dedenda. Determine the number of pairs of teeth in contact and angle turned through by the larger gear for one pair of one pair of teeth in contact. Determine the ratio of the sliding velocity to the rolling velocity at the instant when the engagement commences, engagement terminates and at the pitch point. [8]

Q5. a) Define precisely the following terms: [8]

(i) Coefficient of fluctuation of speed.
(ii) Maximum fluctuation of energy.
(iii) Coefficient of fluctuation of energy.
(iv) Energy stored in a flywheel.

b) A machine is required to punch 5 holes of 40 mm diameter in a plate 30 mm thick per minute. The work required is 700 Nm/cm^2 of the shaded area. The punch has a stroke of 10 cm. the maximum peripheral speed of the flywheel at its radius of gyration is 30 m/s. Find the mass of the flywheel such that the speed does not fall below 28 m/s at its radius of gyration and calculate the power of the motor for the punching operation. [8]

OR

Q6 a)The turning moment diagram for a petrol engine is drawn to the following scales:

Turning moment, 1 mm = 5Nm ; Crank angle, 1 mm = 1^0

The turning moment diagram repeats itself at every half revolution of the engine and the areas above and below the mean turning moment line, taken in order are 295,685,40,340,960,270 mm^2. Determine the mass of 300mm diameter flywheel rim when the coefficient of fluctuation of speed is 0.3% and the engine runs at 1800rpm. Also determine the cross-section of the rim when the width of the rim is twice of thickness. Assume density of the rim material as 7250kg/m^3. [8]

b) A punching press is to be driven by constant torque electric motor. A pressure is provided by a flywheel that rotates at a maximum speed of 225 rpm. Radius of gyration of flywheel rim is 0.5 m. Press punches 720 holes per hour. Each operation takes 2 seconds and requires 15 KNm of energy. Find the power of the motor and the minimum mass of the flywheel if speed of the flywheel not to fall below 200 rpm. [8]

SECTION-II

Q7) Construct the profile of a cam to suit the following specifications: Cam shaft Dia. =40mm, Least radius of cam =25 mm; Dia.Of roller = 25 mm ; Angle of lift = 120^0; Angel of fall = 150^0; Lift of the follower =40 mm; Number of pauses are two of equal internal between motions. During the lift, the motion is S.H.M. During the fall the motion is uniform acceleration and deceleration. The speed of the cam shaft is uniform. The line of stroke of the follower is off-set 12.5 mm from the center of the cam. [18]

OR

Q8) It is required to set out the profile of cam with oscillating power for the following motion:

i) Follower to move outward through an angular displacement of 20^0 during 90^0 of cam rotation;

ii) Follower to dwell for 45^0 of cam rotation

iii) Follower to return to its original position of zero displacement in 75^0 of cam rotation; and

iv) Follower to dwell for the remaining period of the revolution of the cam.

The distance between the pivot center and the follower roller center is 70mm and the roller dia. Is 20mm. The minimum radius of cam corresponds to the starting position of the follower as given in (i).The location of pivot point is 70mm to the left and 60mm above the axis of rotation of the cam. The motion of the follower is to take place with S.H.M. during the outstroke and with uniform acceleration and retardation during the return stroke. [18]

Q9) a) Discuss how a single revolving mass is balanced by two masses revolving in different planes. [8]

b) A, B ,C and D four masses carried by a rotating shaft at radii 100,125, 200 and 150mm respectively. The planes in which the masses revolve are spaced 600mm apart and the mass of B, C and D are 10kg, 5kg, and 4 kg respectively. Find the required mass A and the relative angular settings of the four masses so that the shaft shall be in complete balance. [8]

OR

Q10) The following particulars relate to a two-cylinder locomotive with two coupled wheels on each side:

Stroke = 650mm

Mass of reciprocating parts per cylinder = 240kg

Mass of revolving parts per cylinder =200kg

Mass of each coupling rod = 250kg

Radius of centre of coupling rod pin =250mm

Distance between cylinders =0.6m

Distance between wheels =1.5m

Distance between coupling rods =1.8m

The main cranks are at right angles and the coupling rod pins are 180^0 to their respective main cranks. The balance masses are to be placed in the wheels at a mean radius of 675 mm in order to balance whole of the revolving and (3/4)th of the reciprocating masses The balance mass for the reciprocating masses is to be divided equally between the driving wheels and the coupled wheels. Find:

1. The magnitudes and angular positions of the masses required for the driving and trailing wheels, and
2. The hammer blow at 120km/h, if the wheels are 1.8m diameter. [16]

Q11)a) Explain the concept of critical speed of shaft and drive the equation for it. [8]

b) Derive the equation for equivalent stiffness of spring in
(i) series and (ii) parallel combinations. [8]

OR

Q12) Write a note on Logarithmic Decrement. [8]

b) Derive the equation for the Natural frequency of free longitudinal vibrations. [8]

UNIVERSITY OF PUNE

[4363-143]

T.E.(Production) Examination 2013

Material Forming

(2008 pattern)

Time-Three hours **Maximum Marks-100**

[Total No. of Question=12] **[Total no. of printed pages= 3]**

Instructions:

(1)Answer 3 questions from section-I and 3 questions from section-II

(2)Answer to the TWO sections should be written in separate answer books

(3)Neat diagrams must be drawn whenever necessary.

(4)Figures to the right indicate full marks.

(5)Use of electronic pocket calculator is allowed.

(6)Assume suitable data whenever necessary.

SECTION-I

Q.1 (a)Explain the maximum shear stress theory of plastic deformation. (4)

(b)Explain camplastometer with neat sketch. (8)

(c)Explain importance of material forming operations. (4)

OR

Q.2 (a)Explain the following methods used for the analysis of forming processes. (8)

(i)Slab method

(ii)Slip line method

(b)Explain the effect of temperature,strain rate and friction on metal forming process. (8)

UNIT-II

Q.3 (a)Explain and differentiate between open die and impression (closed)die forging. (6)

(b)Explain briefly the following with neat sketch. (12)

(i)Upsetting

(ii)Counter-locking

(iii)P/M forging

OR

Q.4 Write a short note

(i)Machine forging (6)

(ii)Friction screw press (6)

(iii)Factors considered in selection of parting line (6)

UNIT-III

Q.5 Derive an equation for the drawing stress (σd) in tube drawing operation using fixed taper plug. (16)

OR

Q.6 (a)Explain with neat sketch the various forces acting on a tube during tube drawing operation using floating plug. (6)

(b)Explain the term pickling .liming,sulling and phosphating. (6)

(c)Explain lubrication methods used for wire drawing process.State the lubricants. (4)

SECTION-II

UNIT-IV

Q.7 (a)Explain Automatic guage control system in rolling. (8)

(b)Explain Tandem mill with neat sketch its advantages. (4)

(c)Explain the planetary rolling mill. (4)

OR

Q.8 (a)Explain various methods of rolling to form seamless tubes. (8)

(b)Explain twenty high rolling mill with neat sketch.State the advantages,limitations and applications. (8)

UNIT-V

Q.9 (a)Explain and suggest suitable method to produce the following products. (8)

(i)Aluminum sections for sliding windows.

(ii)Cans for cold beverages.

(b)Derive and equation for work done in extrusion. (8)

Q.10 (a)Explain the layout and set up required for extrusion process with suitable sketch. (8)

(b)Explain the following. (8)

(i)Spider die

(ii)Extrusion process analogy

UNIT-VI

Q.11 Write a short note on

(i)Mediums in explosive forming. (6)

(ii)Field shaper and drivers (6)

(iii)Petro-forge forming (6)

OR

Q.12 (a)Explain HERF.Differentiate it with conventional forming. (6)

(b)Explain strech forming method with neat sketch.State the advantages of stretch forming. (8)

(c)Explain types of explosives used in explosive forming. (4)

UNIVERSITY OF PUNE
[4363]-144
T. E. Production Engineering
Examination – 2013
PRODUCTION MANAGEMENT
(COURSE 2008)

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

SECTION –I

Unit – I

Q.1 a) Define Production, Production Management and state the objectives of Production Management. [8]

b) Explain the operation strategies in production set up. [8]

OR

Q.2 a) What are the types of production system, Explain with the help of block diagram? Explain with suitable example. [8]

b) Define Operation Management and discuss the history of Operations Management. [8]

Unit – II

Q.3 a) Explain with the help of block diagram functions of Production Planning and Control. [8]

b) Write a short note on - [8]

i) Cross functional product design

ii) Economic aspects in product design

OR

Q.4 a) With the help of figure explain states in Product Life Cycle. [8]

b) Write a short not on - [8]

i) Concurrent engineering

ii) Preplanning functions

Unit – III

Q.5 a) Define Plant Layout, explain important factors affecting location decision. [10]

b) Consider a following assembly network relationship of a product. The number of shift per day is one and the number of the working hour per shift is 9. The Company aims to product 45 units of product per shift

Operation No.	Immediate Preceding Task	Duration (Min)
A	-	8
B	A	3
C	A	2
D	A	4
E	A	7
F	C,G	4
G	B	5
H	D,E	6
I	F	8
J	G,H,I	8

i) Draw the precedence diagram. [2]
ii) What is the desired cycle time? [2]
iii) What is the theoretical number of workstation? [2]
iv) What are the efficiency and balance delay of the solution obtained. [2]

OR

Q.6 a) Define Material Handling System. State the principle of Material Handling system. [10]

b) Write a short note on - [8]
i) line balancing
ii) computerized layout planning

SECTION – II

Unit – IV

Q.7 a) Define Sales forecasting. What are the short term and long term techniques of sales forecasting? [8]

b) Calculate the trend of sales using 4 &5 years moving average sales data for the years as given below [10]

Years	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Sales	12	14	15	18	17	16	20	22	25	24

Forecast the demand for the year 2011.

OR

Q.8 a) Explain aggregate capacity planning & manpower planning [8]

b) There is correlation between population of the city and AC sold in May. [10]
This relation is shown in the following table.

Population in lakhs	4	6	11	14	15	18
Quantity sold in thousands	5	7	10	12	13	15

Estimate the sales of AC with population 23 and 28 lakhs.

Unit - V

Q.9 a) Explain Forward and Backward scheduling in detail. [8]

b) There are seven jobs each of which has to go through the machines [8]
the order of M1 and M2 in the order of M1 M2. Processing time in hours
in given as:

Jobs	1	2	3	4	5	6	7
Machine M1	3	8	7	4	9	8	7
Machine M2	4	3	2	5	1	4	3
Machine M3	6	7	5	11	5	6	12

Determine a sequence of these jobs that will minimize the total elapsed time
associated with machine M2 and machine M3.

OR

Q.10 a) Classify scheduling techniques. Explain one method of scheduling [8]

b) The activity details and their predecessors are given below along with [8]
their activity times. Construct the network diagram and compute the
critical path.

Operation No.	Immediate Preceding Task	Duration (Weeks)
A	-	8
B	-	10
C	-	9
D	C	7
E	A,B	16
F	E,D	12
G	D	8
H	F,G	6

Unit - VI

Q.11 a) Explain in short Just-in-Time (JIT) system & Learn manufacturing. [8]

b) Explain –Energy Audit and Energy Conservation [8]

OR

Q.12 a) Agile & reconfigurable manufacturing [8]

b) Write a short note on Supply Chain Management. [8]

UNIVERSITY OF PUNE
[4363]-145
T. E. (*Production*) Examination - 2013
(Cutting Tool Engineering)(311085)(2008 Course)

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

Instructions:

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

2 *Draw neat diagrams wherever necessary.*

4 *Use of logarithmic tables, electronic pocket calculator is allowed.*

5 *Attempt one Question of each unit from Section-I and Section-II*

SECTION –I

UNIT-I

Q.1 A Explain the procedure for force measurement in drilling operation [5]

B A tubing of 60 mm outside diameter is turned on a lathe at a cutting speed of 30 m/min and feed 0.5 mm/rev, the rake angle of a tool a 20 degree. The cutting force is 400N and feed force 150N, the length of continuous chip in one revolution is 50mm, calculate- [10]

i) chip thickness ratio
ii) chip thickness
iii) shear plane angle
iv) coefficient of friction
v) velocity of chip along tool face

C Describe with neat sketch orthogonal cutting and oblique cutting. Why orthogonal cutting conditions are used in experimental work on cutting. [5]

OR

Q.2 A Explain a mechanism of metal cutting with the help of [7]

		neat diagram and comment on the observation made during the machining operation	
	B	Derive an expression for shear angle $$\Phi = \tan^{-1}\left(\frac{r\cos\alpha}{1 - r\,Sin\,\alpha}\right)$$ r= Chip thickness ratio, α=rake angle	[6]
	C	Draw Merchant's force circle and State assumptions and limitations.	[7]
		UNIT-II	
Q. 3	A	What is meant by negative rake tool? Distinguish between solid tool and tipped cutting tool? Explain why cemented carbide tool are provided with negative rake angle in machining high strength and hard materials	[7]
	B	What is ORS system of tool signature? What is the importance of describing the tool geometry in the ORS system?	[8]
		OR	
Q. 4	A	List different types of cutting tool materials used in metal cutting. What are the distinguish features of cutting tool? Discuss.	[7]
	B	Draw the tool geometry along with a one tooth and label the important part of Reamer	[8]
		UNIT-III	
Q. 5	A	Explain heat affected zone (HAZ) in metal cutting? discuss how to reduce HAZ.	[7]
	B	Prove that, Topt=(1-n/n)$(K_1 t_c + K_2/K_1)$ where, k_1=Operating cost Rs/Min, K_2=Tool cost/cutting edge, Rs/tool failure. tc=tool changing time min.	[8]
		OR	
Q. 6	A	Explain the effect of drill tool geometry and cutting variables on tool life	[7]
	B	Find out optimum cutting speed and corresponding tool life for minimum cost for machining of mild steel work piece with HSS tool from following data. When the cutting speed was 40m/min the tool life was 180	[8]

minutes and when the speed was increased to 60m/min, the tool life was dropped to 45 minutes. Operating cost is 20 paise/min. Tool cost/cutting edge/tool failure is Rs.1.5 and tool changing time=1min

SECTION II

UNIT-IV

Q. 7	A	A hole in a component is to be finished to 30.5+0.01 mm in diameter, the hole size before broaching is 29.5+0.05 mm in diameter. Determine pitch of teeth, length of cutting portion, number of cutting teeth contact at a time, total length of broach and force required to pull the broach through work. The work piece having length 40mm long. Given rise/tooth=0.020mm, No. of finishing teeth=4, force to remove/mm^2 of metal is 4500N. Also sketch the broach you designed and show dimensions on it.	[10]
	B	Explain the design procedure for reamer tool.	[5]

OR

Q. 8	A	What are formed tools? Describe the method for determining the outside diameter and the profile of circular form tool	[7]
	B	Calculate the cross section of a straight shank single point turning tool made of HSS. Data given are, allowable bending stress of HSS=200MPa, Young's modulus of HSS=2×10^5 MPa Main cutting force=1200N Permissible deflection of tool tip=0.05mm, Also draw the tool geometry of the tool by assuming angles.	[8]

UNIT-V

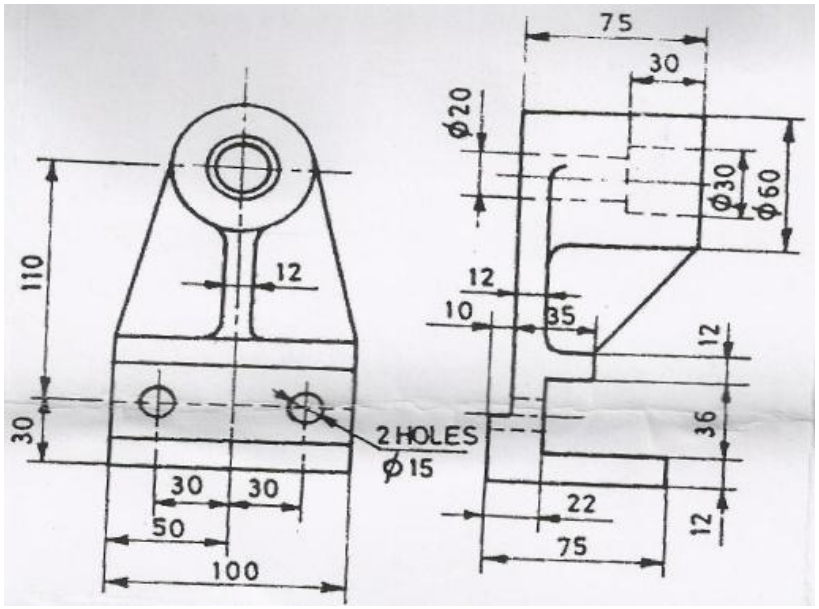
Q. 9	A	Explain the concept of economical consideration in jig and fixture design	[7]
	B	Write a short note on-i) Fool proofing principle ii) Modular fixture	[8]

OR

Q. 10	A	What are the locators? Explain design aspect of locator	[8]
	B	Explain selection criteria for clamping devices	[7]

UNIT-VI

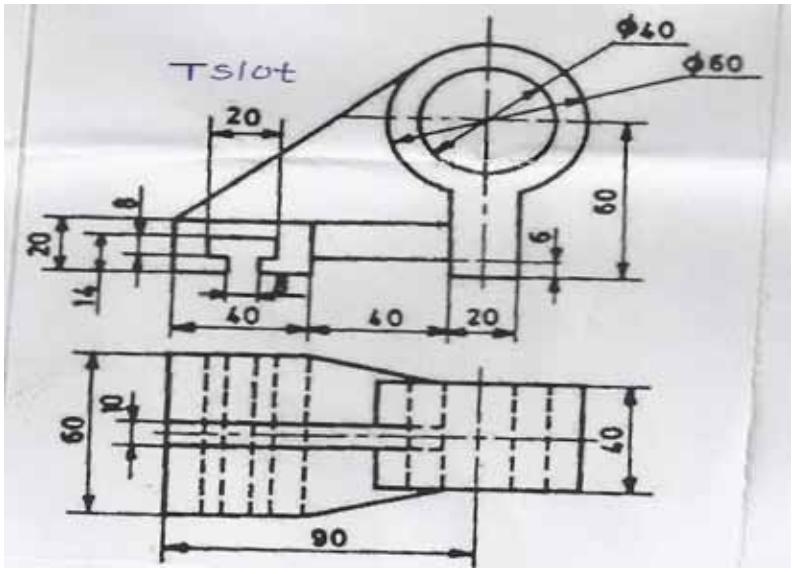
Q. 11 A Design a jig for drilling 2 holes Φ 15 mm holes for a component shown in fig.no1 [20]



OR

Q. 12 A Design a milling fixture to mill a Tslot of 20 mm wide X14mm deepX60mm in length for a component shown in fig.no2 [20]

Draw minimum two views of your design, show the component in position, name all important elements in drawing, write a part list of your design and draw detail view for locating, clamping and bushing



UNIVERSITY OF PUNE
[4363]-147
T. E. (PRODUCTION) Examination 2013
TOOL DESIGN
(2008 Pattern)

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

Instructions :

(1) *Answers any 3 questions 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.
(6) Use of logarithmic tables slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.

SECTION-I

Q.1 Design a blanking die for the component as shown in figure 1.

i) Draw strip layout and find percentage utilisation of the strip. [6]
ii) Find cutting force and press tonnage. [4]

iii) Design die block and punch [6]

Given: Strip size = 2440mm x 1220mm, Thickness of strip= 1mm, Shear strength of the material=200MPa.

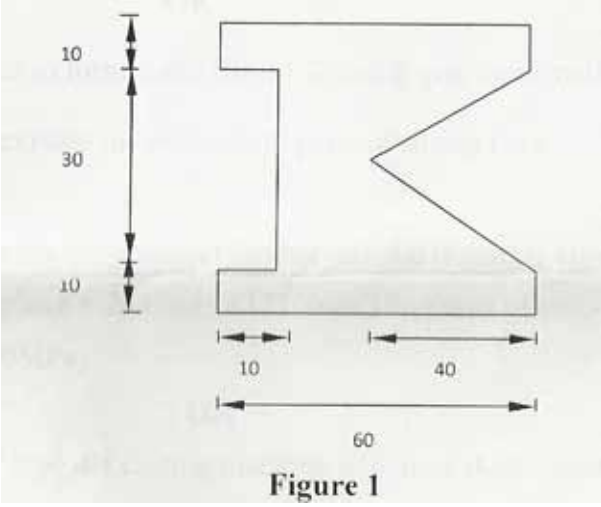


Figure 1

OR

Q.2a) Calculate centre of pressure for the component as shown in figure 1. [6]

b) Explain OBI press with neat sketch. [4]

c) Explain combination die with neat sketch. [6]

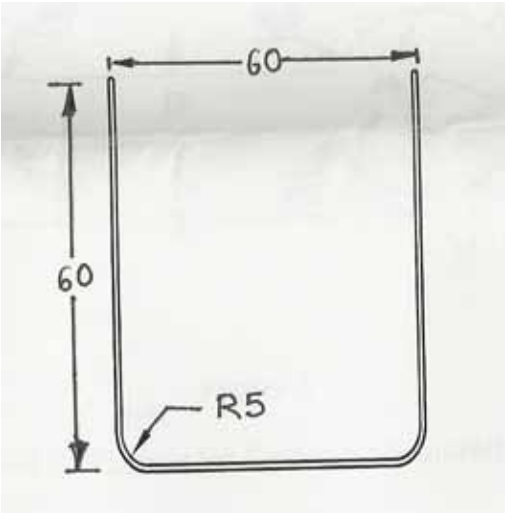
Q.3a) Design a Drawing die for the component as shown in figure2.

a) Calculate blank size [4]

b) Calculate number of draws, cup diameter and height in each draw. [6]

c) Determine punch and die dimensions [3]

d) Determine press capacity (Assume stock thickness=0.8mm) [3]



OR

Q.4a) Calculate blank size required to form a cup (figure2) using graphical method. [8]

b) What is 'spring back' and explain the methods to prevent spring back. [8]

Q.5 Design a complete progressive die for a washer having internal diameter 10 mm and external diameter 20mm. (Assume Strip size =2440mm x 1220mm,Thickness of strip =2mm,Shear strength of material =300MPa). [18]

OR

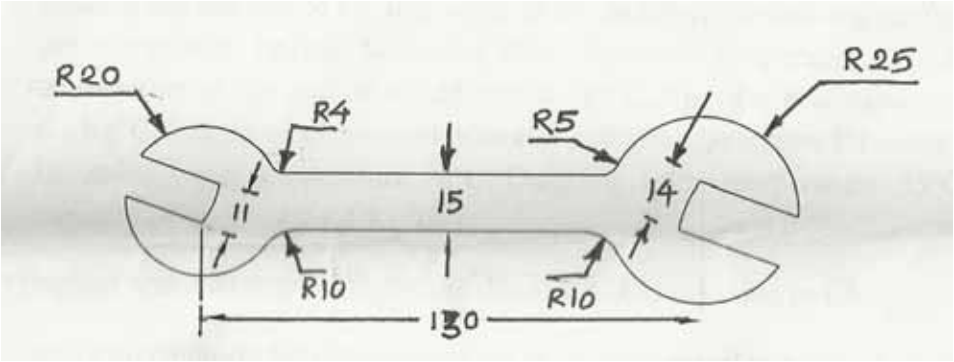
Q.6a) Explain submerged plunger type die casting machine with neat sketch. State the applications. [6]

b) Explain the methods of piloting. Explain various types of pilots. [6]

c) Explain compound die with neat sketch. [6]

SECTION II

Q.7a) Design the forging die for the component shown in figure 3. Thickness of part is 4mm. Density of material is 7.85 g/cm^3 . [16]



OR

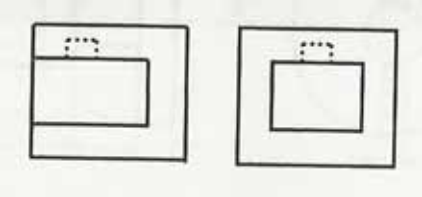
Q.8a) Explain the functions of flash. How the flash can be controlled? [6]

b) Explain: i)Blend draft ii) Natural draft iii)Shift draft [6]

c) Explain edging impression with neat sketch. [4]

Q.9a) Explain with neat sketch the principle of working of blow molding process. Also state its applications. [6]

b) Draw the configuration of injection mould for producing PVC box having internal undercut as shown in figure 4. [10]



OR

Q.10a) Compare the compression molding process with transfer molding with respect to process characteristics, advantages, limitations, and applications. [8]

b) Sketch and explain pressure time diagram for injection molding. [8]

Q.11a) Calculate the amount of cooling water to be circulated for cooling the injection mold for the component having following data: Injection temperature of plastic = 210^0C, temperature at the end of solidification =85^0C, Specific heat capacity of plastic 3.72 KJ/Kg^{0}C, weight of plastic component = 308 gm. Cycle time for component =28 sec., Incoming water temperature 20^0C, Outgoing water temperature: 35^0C, Specific heat capacity of water: 4.2 KJ/Kg^{0}C. [6]

b) Explain with suitable examples the use of CAD in injection molding. [6]

c) Derive an equation for determining the most economical number of cavities for injection mold. [6]

OR

Q.12 For the component shown in figure 5.

Give that: Material PVC with density 1.38 gm/cm^3; Shrinkage 0.96%spatial;

Modulus of elasticity : $3x10^3$ MPa; Number of impressions:2.

a) Calculate mold opening force [3]

b) Select the suitable ejection element and calculate its dimensions. [4]

c) Determine the dimensions of gates and runner. [4]

d) Design the split actuation mechanism. [3]

e) Sketch the complete assembly of injection mold in operation. [4]

DIAGRAM PENDING

UNIVERSITY OF PUNE

[4363]-148
T. E. (Production), Examination - 2013
INDUSTRIAL ENGINEERING AND QUALITY ASSURANCE
(2008 Pattern)

[Time : 3 Hours] **[Max. Marks : 100]**
[Total No. of Questions : 11] **[Total No. of Printed Pages :3]**

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 non-programmable electronic calculator is allowed.
(6) Assume suitable data, if necessary.

SECTION I

Q1) a) Define Industrial Engineering. Explain in detail the contribution of F.W. Taylor and Gantt in the development of Industrial Engineering. [10]

b) Explain how the bad design of component increases total work content. [8]

OR

Q2) a) What are the tools and techniques of Industrial Engineering? Explain in brief. [10]

b) What are the functions of Industrial Engineering? [8]

Q3) a) Explain in short the economic, technical and human considerations in Selecting the job for method study. [8]

b) Explain in brief the steps involved in the method study. [8]

OR

Q4) a) Explain with neat sketch standard five symbols used in method study for recording the activities. [8]

b) Explain with example flow process chart and SIMO charts used in method study. [8]

Q5) a) What are the types of elements in time study? What are the reasons for breaking the job into elements? [8]

b) Explain with neat sketch the equipments used for during the time study. [8]

OR

Q6) a) What is PMTS in time study? What are the factors to be considered while doing time study? [8]

b) Explain in detail the allowances used in time study. [8]

SECTION II

Q7) a) What do you know by cost of quality and value of quality? How to balance them? [8]

b) A machine is working to a specification of 12.58 $\pm$0.05 mm. A study of 50 consecutive pieces shows the following measurements: [8]

1	2	3	4	5	6	7	8	9	10
12.54	12.58	12.61	12.57	12.57	12.58	12.60	12.65	12.60	12.65
12.58	12.57	12.60	12.61	12.60	12.59	12.62	12.57	12.59	12.61
12.62	12.60	12.64	12.56	12.62	12.59	12.61	12.57	12.60	12.60
12.56	12.60	12.58	12.59	12.61	12.56	12.67	12.56	12.63	12.62
12.59	12.61	12.64	12.59	12.58	12.57	12.60	12.61	12.56	12.62

i) Determine the process capability.

ii) Determine $\bar{X}$ and R control limits.

iii) State whether the machine is capable of meeting the tolerances?

iv) Calculate the % defective. if any

v) Suggest the possible ways by which the percent defective can be reduced.

Assume: a) Normal distribution

b) d_2 for sub-group size 5 is 2.326

OR

Q8) a) Explain the following as applied to quality control: [8]

i) Appraisal Cost ii) Prevention Cost iii) Failure Cost

iv) Optimum Cost

b) In a manufacturing process, the number of defectives found in the inspection of 15 lots of 400 items each are given below: [8]

Lot No.	No. of defective	Lot no.	No. of defective
1	2	9	18
2	5	10	8
3	0	11	6
4	14	12	0
5	3	13	3
6	0	14	0
7	1	15	6
8	0		

i)Determine the trial control limits for np chart and state whether the process is in control.

ii) What will be new value of mean fraction defective it some obvious points outside control limits are eliminated. What will be the corresponding upper and lower control limits and examine whether the process is still in control or not.

Q9) a) What is definition of quality in Total Quality Management? Discuss in detail Deming's and Juran approaches. [10]

b) Explain concept of Six Sigma with appropriate manufacturing example. [6]

OR

Q10) a) What do you mean by term Reliability? [4]

b) What is Design of experiments? What are objectives for performing Design of experiment? [6]

c) Explain with neat sketch cause and effect diagram used in quality assurance system. [6]

Q11) Write short note on: (Any 3) [18]

a) Different ISO standards.

b) Total Productive Maintenance.

c) Process Capability & Process Capability Index.

d) Operating Characteristic Curve (OC)

e) Pareto Analysis & Quality circle.

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

UNIVERSITY OF PUNE
[4363]-149
T. E. (PROD. ENGG./ PROD. ENGG.S/W) Examination - 2013
NUMERICAL TECHNIQUES AND DATABASE (2008 Course)

[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, electronic pocket calculator and steam tables is allowed.*

6 *Assume suitable data, if necessary.*

SECTION -I

UNIT –I

Q.1 A What is a database model? Explain any two types of data models with an example for each. 8

B Discuss the three level architecture of DBMS. Explain how does it lead of data independence. 8

OR

Q.2 A Why is the administration of a database system required? What are the various functions associated with database administration? 8

B Define a data manipulation language. Compare DBMS and File processing system with following points: 8

i) Redundancy ii) Access Control

UNIT II

Q. 3 A Consider an employee file with the details given below 14

Record	E No	Name	Occupation	Degree	Sex	Location	Salary
A	800	Milind	Programmer	ME	M	Delhi	10000
B	565	Adwet	Analyst	BE	M	Mumbai	6000
C	75	Devendra	Analyst	ME	M	Delhi	8000
D	569	Mukesh	Programmer	BE	M	Chennai	9000

i) Create the above table using SQL syntax

ii) Write a query to retrieve the record of Salary > 12000 Degree = M.E., Location = Delhi,

Occupation = Analyst , Sex = M.

iii) Insert additional record E with appropriate data for other columns

iv) Write a query to modify occupation of record C to Senior Analyst

v) Write a query to delete the created record E.

B Explain the difference between DELETE and TRUNCATE commands? 4

OR

Q. 4 A Describe the components of entity-relationship diagram with suitable examples 6

B Write a short note on normalization with an example 6

C What is the difference between 6

i) a HAVING CLAUSE and a WHERE CLAUSE

ii) UNIQUE and PRIMARY KEY constraints?

UNIT III

Q. 5 A What do you understand by EDI? Why EDI important in e-commerce? Explain? 8

B What is ERP? Explain ERP with respect to production and operations management? 8

OR

Q. 6 A Explain the following terms: 8

i) Data

ii) Information

iii) Knowledge

iv) Artificial Intelligence

B What is an expert system? Explain in brief the need and structure of expert systems in manufacturing? 8

SECTION II

UNIT -IV

Q. 7 A Write a C program to determine the area of a triangle using the formula 6

area= $\sqrt{s(s-a)(s-b)(s-c)}$, where s= $\frac{a+b+c}{2}$

B Round off the numbers 865250 and 37.46235 to four significant figures and compute absolute error, relative error and percentage error in each case. 6

C Write a C program that reverses the digits of a given positive integer say 1234 using a while loop. 6

OR

Q. 8 A What do you mean by truncation error. Find the truncation error for e^x at x=1/5 if first three terms are 6

retained in expansion.

Take $e^x = 1+\frac{x}{1!}+\frac{x^2}{2!}+\frac{x^3}{3!}+\ldots, -\infty < x < \infty$

B Evaluate $\sqrt{12}$ to four decimal places by Newton-Raphson method. 6

C Solve the following system of equations using Gauss-Siedal iterative method. 6

$9x+4y+z = -17$

$x-2y-6z = 14$

$x+6y = 4$

UNIT -V

Q. 9 A Show that the line of fit to the following data is given by $y = 0.7x + 11.285$. 6

X	0	5	10	15	20	25
y	12	15	17	22	24	30

B The following table gives the marks secured by 100 students in the Numerical Analysis subject 10

Range of marks	**30-40**	**40-50**	**50-60**	**60-70**	**70-80**
No. of students	**25**	**35**	**22**	**11**	**7**

Use Newton's forward difference interpolation formula to find:

i) Number of students who got more than 55 marks

ii) Number of students who secured marks in the range from 36 to 45

OR

Q. 10 A The function $y = f(x)$ is given at the points (7,3), (8,1), (9,1) and (10,9). Find the value of y for $x = 9.5$ using Lagrange's interpolation formula. 8

B Obtain a relation of the form $y=a.b^x$ for the following data by the method of least squares 8

x	2	3	4	5	6
y	8.3	15.4	33.1	65.2	126.4

UNIT – VI

Q. 11 A "You want to buy a new car and have identified four models you like: a VW Golf, an Opel Astra, a Ford Focus and a Toyota Corolla. The decision will be made according to price, petrol consumption, and power. You 8

prefer a cheap and powerful car with low petrol consumption".
Explain the concept of "optimization" by assuming suitable data for the parameters gives in the above statement.

B Solve the equation by using finite difference method $y''(x) - x.y'(x) = 0$ for $y(x_i)$, $x_i = 0, 1/3, 2/3$. Given that $y(0) + y'(0) = 1$ and $y(1) = 1$. 8

OR

Q. 12 A Given $\frac{dy}{dx} = y - x$, $y(0) = 2$. Find $y(0.1)$ and $y(0.2)$ correct to four decimal places using Runge-Kutta second order method. 8

B Solve by using Runge-Kutta method $\frac{dy}{dx} = yz + x$, $\frac{dz}{dx} = xz + y$; given that $y(0) = 1$, $z(0) = -1$ for $y(0.1)$, $z(0.1)$ 8

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

UNIVERSITY OF PUNE
[4363]-150
T. E. (Production Engg.) Examination - 2013
PRODUCTION METALLURGY
(Common to Productin S/W)
(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. *Neat diagrams must be drawn wherever necessary.*
4. *Black figures to the right indicate full marks.*

SECTION -I

Q.1	A	Explain with neat diagrams the peritectic and eutectoid reactions in the Fe-Fe_3C	8
	B	Write short notes: 1) Etching mechanisms 2) Sulphur printing	6
	C	What is macroscopy? What information is obtained by macroscopic studies of components?	4
		OR	
Q.2	A	Draw microstructures: 1) 0.2% C Steel 2) Widmanstatten structure for hypereutectoid steel 3) 0.8% C Steel	6
	B	Calculate amounts of phases that are obtainable at room temperature if 1.2% C Steel is cooled under equilibrium cooling condition with a suitable diagram. Also define those phases.	6
	C	Give typical composition of the following: 95Cr5Mol, 35NiCr60, En8, AISI9260, St50 and T105Cr1Mn60	6
Q. 3	A	Explain the transformation of Austenite to Pearlite with a neat diagram with its characteristics.	6
	B	State the advantages of Isothermal Annealing over conventional Annealing with a neat diagram.	6
	C	Draw self explanatory diagram for 1) Ausforming 2) Martempering	4

OR

Q. 4	A	Define the Critical Cooling Rate and distinguish between TTT and CCT diagrams.	4
	B	Explain with neat graph the changes taking place during the various stages of tempering	6
	C	Define hardenability and explain the Jominy hardenability test.	6
Q. 5	A	What is carburizing? Why is it done? Is it necessary to carry post carburizing treatments?	6
	B	State the advantages and limitations of nitriding over carburizing.	4
	C	Describe the induction hardening process and give its merits and demerits over the flame hardening process.	6

OR

Q. 6	A	Write short notes on: 1) Carbonitriding 2) Patenting 3) Austempering 4) Isoforming	16

SECTION II

Q. 7	A	State effects of following alloying elements on alloy steel: Cr, Va	4
	B	Write short notes on: 1) White cast iron 2) Silai and Nicrosilal 3) Sensitization	12
	C	Draw microstructure: 1) Pearlitic gray cast iron	2

OR

Q. 8	A	Write short notes on: 1) Martensitic stainless steels 2) Heat treatment of 18-4-1 High Speed tool Steel.	8
	B	Which alloy steels would you suggest for the following applications and justify: 1) Utensils 2) Lathe tools 3) Master tools 4) Extrusion dies 5) Plastic moulds	10

Q. 9	A	Give typical composition, 1 property and 1 application for the following: 1) LM14 2) Inconel 3) Tinman's Solder 4) German Silver	12
	B	Wrie shot notes on; 1) Dezincification 2) Season cracking of brasses	4
		OR	
Q. 10	A	State the properties of a good bearing material.	4
	B	Give typical composition, 1 property and 1 application for the following; 1) Phosphor Bronze 2) Alnico 3) Pb-based babbits 4) Constantan	12
Q. 11	A	Define composites. Classify them and explain particulate composites with suitable diagrams.	8
	B	Write shot notes: 1) Biomaterials 2) Different types of fibres	8
		OR	
Q. 12	A	Define : 1) Whiskers 2) Prepegs 3) Tapes 4) Mats	4
	B	State the properties and applications of Nanomaterials and Sports materials.	8
	C	A glass fibre reinforced polystyrene contains 40 volume % of parallel fibres. Estimate the Young's modulus of the composite in the longitudinal direction of the fibres. Young's modulus of glass is 70 GN/m^2 and that of polystyrene is 2.6 $GN/m^{2.}$	4