T.E. (Production S/W) (Semester – II) Examination, 2009
PROCESS PLANNING AND INDUSTRIAL STATISTICS

Time: 3 Hours   Total Marks: 100

Instructions : 1) Answers to the two Sections should be written in separate
books.
2) Neat diagrams must be drawn wherever necessary.
3) Black figures to the right indicate full marks.
4) Assume suitable data , if necessary.
5) All questions are compulsory.

SECTION – I
Unit – I

1. a) Define process planning. Explain functions of process engineer.   **6**

   b) A gear pump shaft is shown in Fig. 2.2. Five pieces per shift of 8 hours is
   required to be produced. The part should be produced from 25 mm diameter
   standard stock by using machining operation.

   Carry out detailed part print Analysis.   **10**
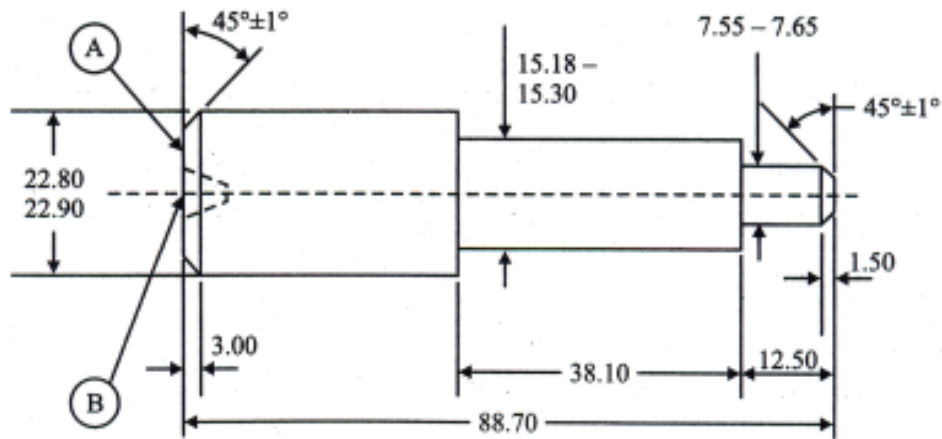
Material: 25 mm diameter SAE 1030 cold drawn steel
All Tolerances : ± 0.05 unless otherwise specifield
All dimensions are in mm. Number of parts required : 5
Fig 2.2. Gear shaft for water pump.

OR

1. a) Fig. 5.8, shows the component to be made by upsetting a ɸ 20 mm bar. 150 components per shift of 8 hrs to be produced.
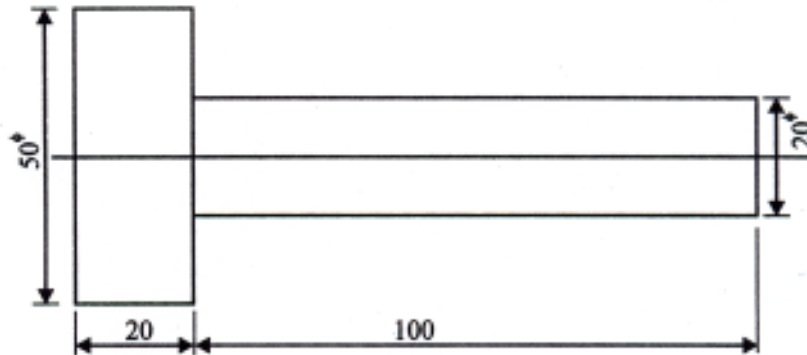Draw and explain process picture sheet for given component. **12**

Fig. 5.8

b) Explain role of product engineering department in process planning. **4**

Unit – II

2. a) For the component shown in fig. 5.23 to be manufactured by using standard lathe machine, explain following : **12**

   i) Locating Area

   ii) Supporting Area

   iii) Holding Area

   for chamfering operation, step turning operation. Explain how will you achieve location control, mechanical control and geometric control for the above component during machining.
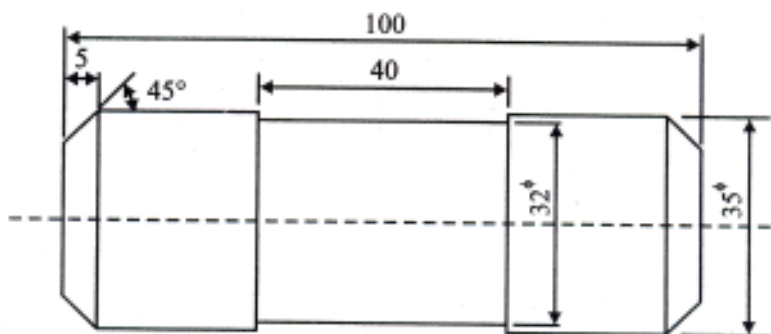

Fig. 5.23

b) Compare different manufacturing process with respect to surface finish achieved. **4**

OR

2. Calculate the machining time required to produce one piece of component shown in fig. 5.25. Component is required to be produced from φ25 mm bar.
Use following data :
For turning :
Cutting speed = 40 m/min
Feed = 0.4 mm/rev
Depth of cut = 2.5 mm/pass
For thread cutting :
Cutting speed = 8 m/min **16**

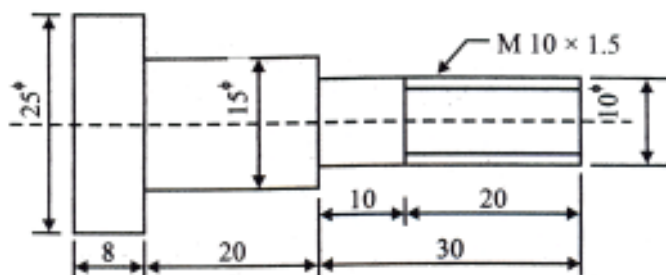Fig. 5.25

Unit – III

3. Prepare a process plan for a component to be produced by using standard lathe machine as shown in fig. 2.5.

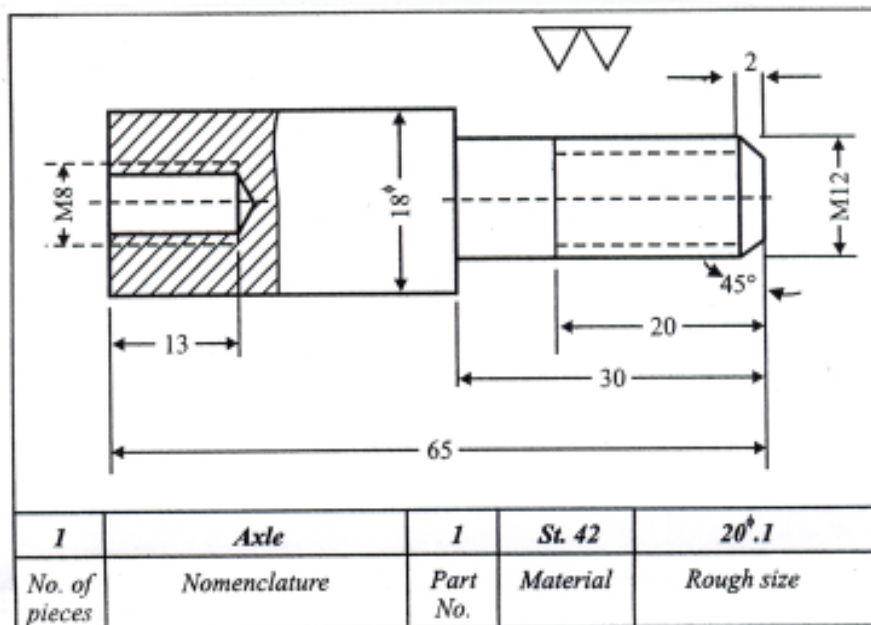| No. of pieces	Nomenclature	Part No.	Material	Rough size
1	Axle	1	St. 42	20⌀.1

Fig. 2.5. Component drawing of an "Axle".

The process plan should include

  i) Manufacturing process plan : selection of machine tool, details of measuring instrument, work and tool holding devices, cutting tools, special tools required if any.

  ii) Operations process plan in tabular format containing operation sequence, manual/ machine operation, speed, feed, depth of cut, other machining parameters and frequency of operation. Also include time estimate for each operation.

  iii) Estimate total time of manufacturing considering 5% fatigue allowance of normal time. **18**

OR

3. Prepare a process plan machine to drill four 8 mm diameter holes and one 40 mm dia central hole for the component shown in fig. 5.26. 20 mm dia hole to be drilled first and then enlarged to 40 mm ϕ hole.

Material for given job is M.S.Plate

The process plan should include

  i) Manufacturing plan-selection of machine tools, details of measuring instruments, work holding devices, cutting tools, special tools required if any and their sketches to accompany.

  ii) Operation process plan-operation sequence, manual/ machine operation, speed, feed, depth of cut and other machining parameters for each operations and time estimates for each operation.

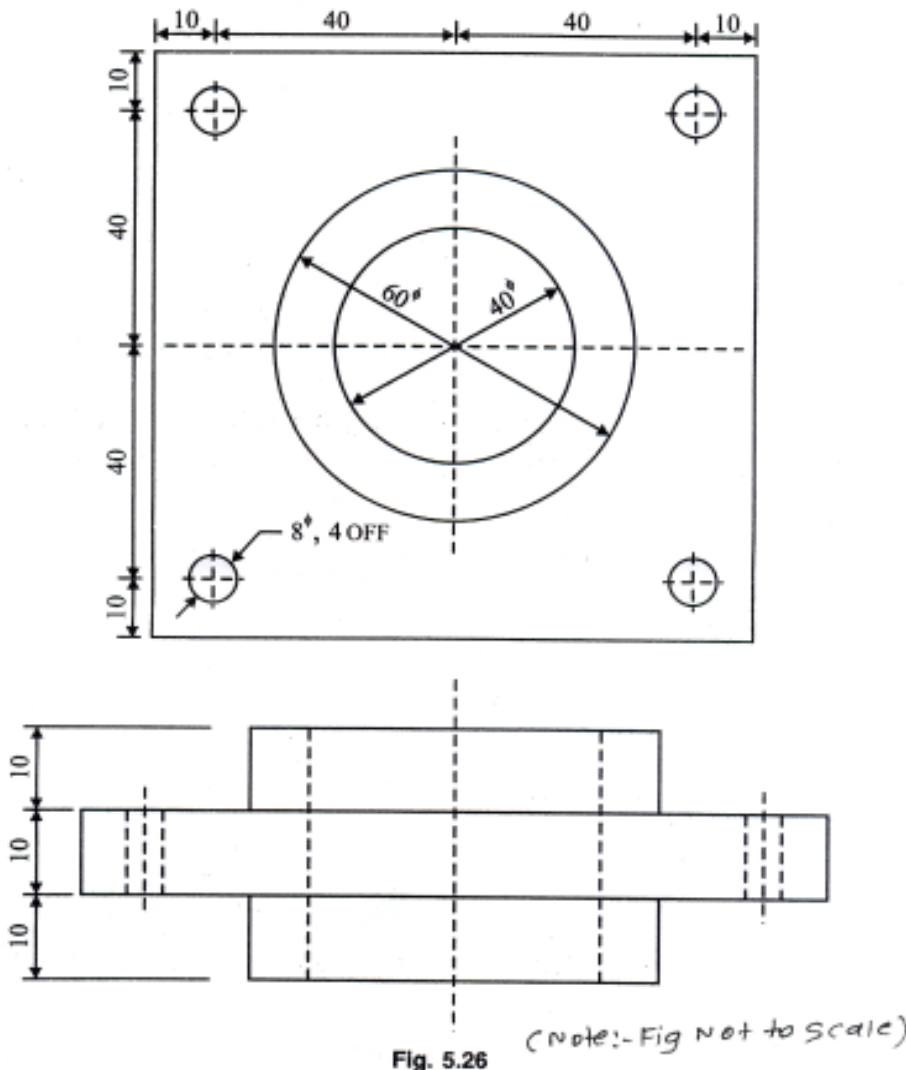 iii) Estimate total time of manufacturing for producing 100 No. of such jobs. **18**

(Note:- Fig Not to scale)

Fig. 5.26

SECTION – II
Unit – IV

4. A) What is the purpose and utilization of Tolerance Charts ? **8**

   B) What are the three basic methods by which surface roughness is measured ? Explain. **8**

                   OR

4. A) Define following with the help of diagram : **8**
      i) Datum   ii) Flatness   iii) Allowance   iv) Tolerance

   B) Construct a $\overline{X}$ chart and R chart for following observations **8**

Sample No.	n = 4 (4 observations in each sample)			
1	15	12	13	20
2	10	8	8	14
3	8	15	17	10
4	12	17	11	12
5	18	13	15	4
6	20	16	14	20
7	15	19	23	17
8	13	23	14	16
9	9	8	18	5
10	6	10	24	20
11	5	12	20	15
12	3	15	18	18
13	6	18	12	10
14	12	9	15	18
15	15	15	6	16
16	18	17	8	15
17	13	16	5	4
18	10	20	8	10
19	5	15	10	12
20	6	14	12	14

(Given : $A_2 = 0.729$, $D_3 = 0$, $D_4 = 2.282$)

Unit – V

5. A) Discuss various methods of collecting Primary data. **8**

   B) From the following data obtain the two regression equations. **8**

Sales	91	97	108	121	67	124	51	73	111	57
Purchase	71	75	69	97	70	91	39	61	80	47

   OR

5. A) What do you understand by the term "regression" ? With the help of example illustrate how regression analysis helps in business decision-making. **8**

   B) Define hypothesis. Explain the types of hypothesis with suitable examples. **8**

Unit – VI

6. A) If coin is tossed 15 times, what is the probability of having ?

   i) 0 heads;

   ii) 5 heads;

   iii) at most 3 heads;

   iv) at least 4 heads. **8**

   B) The arrival rate of vehicles arriving at a toll gate follows Poisson distribution with a mean arrival rate of 50 vehicles per hour. Find the probability that.

   i) no vehicle will arrive in one hour.

   ii) exactly 40 vehicles will arrive in one hour,

   iii) at most 5 vehicles will arrive in one hour. **6**

   C) Explain : single and double Sampling . **4**

   OR

6. Explain in brief **any three** of the following : **18**

    i) Control chart for variables and attributes

   ii) OC curve

  iii) Procedure of testing hypothesis

   iv) AQL and LTPD

    v) Measure of central tendency.

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T.E. (Prod./SW) (Sem. – I) Examination, 2009
MANUFACTURING ENGINEERING TECHNOLOGY
(2003 Course)

Time : 3 Hours   Max. Marks : 100

*N.B. : 1) Answers to the **two** Sections should be written in **separate**
        books.*
*2) **Neat** diagrams must be drawn **wherever** necessary.*
*3) **Black** figures to the **right** indicate **full** marks.*
*4) **Use** of logarithmic tables, slide rule, Mollier charts, electronic
        pocket calculator and steam tables is **allowed.***
*5) Assume **suitable** data, **if necessary**.*

SECTION – I

1. a) Differentiate between **(any three)** :   **18**

    i) Inspection and quality control.

    ii) Cost of quality and value of quality.

    iii) Quality of design and quality of conformance.

    iv) Quality policy and quality objectives.

                        OR

1. a) What is TQM ? Describe internal and external customer and supplier link concept
    in TQM.   **9**

    b) Explain the methodology and implementation of 'Five S' in large scale
    manufacturing organisation.   **9**

2. Explain following quality management tools :   **16**

    a) Cause-Effect diagram

    b) Brain storming

    c) Pie chart and check sheet

    d) Pacreto analysis.

                        OR

2. Explain the following : **16**
   a) Poka yoke
   b) Six sigma
   c) Zero defect
   d) QFD.

3. Discuss the metrological properties of measuring instruments. **16**

                    OR

3. a) Explain with neat sketch the electrical comparator. **7**

   b) Differentiate between **4**

       i) Line standard and end standard.

       ii) Accuracy and precision.

   c) Explain with sketch "Slip gauge manufacturing". **5**

SECTION – II

4 a) Calculate the value of constant cloud and its depth from the tip of the gear of module 4 mm and 20° pressure angle. **4**

   b) Explain the base tangent method. **8**

   c) Write a short note on Parkinson gear tester. **6**

                    OR

4. Write short notes on : **18**
   a) Thread cursors and their effects
   b) Talysurf
   c) Three wire method.

5. Write short note on : **16**
   a) Taylor's principle
   b) Auto collimeter
   c) Tool Maker's Microscope.

                    OR

5. Write short notes on : **16**

   a) Angle dekor

   b) Optical flat

   c) Profile projector.

6. Explain with neat sketch, the procedure to check the **16**

   a) Spindle run out.

   b) Parallelism of spindle Aubon Assembly.

   c) Squareness of spindle movement.

   d) Straightness of straight wedge.

                        OR

6. Write short notes on **(any three)** : **16**

   a) Surface plate

   b) CMM

   c) CNC performance test

   d) Flatness testing methods.

   _____

T.E. (Production Engg. / Production Engg. S/W) (Sem. – II)
Examination, 2009
DATABASE AND INFORMATION TECHNOLOGY
FOR PRODUCTION ENGG.
(2003 Course)

Time : 3 Hours   Max. Marks : 100

Instructions *: 1) Answer **any one** question from **each** Unit.*
*2) Answers to the **two** Sections should be written in **separate** books.*
*3) Neat diagrams must be drawn **wherever** necessary.*
*4) Black figures to the **right** indicate **full** marks.*
*5) **Use** of electronic pocket calculator is **allowed**.*
*6) **Assume** suitable data, **if** necessary.*

SECTION – I

Unit – I

1. a) Draw a neat line diagram for organization of a database and explain.   **7**

   b) Explain the entity - relationship model with an example.   **5**

   c) Explain the functions of database administrator.   **4**

                                OR

2. a) Write the correct SQL syntax for modifying the structure of tables under the following cases :   **6**
   i) Adding new columns ii) Modifying existing columns.

   b) Compare DBMS and file processing system with following points
   i) Redundancy ii) Access control.   **6**

   c) What are the different types of data types used in SQL ?   **4**

Unit – II

3. a) Create a table 'sales_ order _ details' in SQL with the following constraints on the table :   **4**

Column Name	Data Type	Size	Attributes
S_order_no	Varchar2	6	Primary Key
Product_no	Varchar2	6	Primary Key
Qty_ordered	Number	8	Not null
Qty_disp	Number	8	-
Product_rate	Number	8, 2	Not null

b) Give an expression/s in SQL for each of the following queries from the
   table sales_order_details :   **8**
   i) List the names of products whose name starts with letter 'p'.
   ii) Insert any three records of your choice using INSERT command.
   iii) Update any one record using UPDATE query.
   iv) Delete specified number of records.

C) Explain 'primary key' and 'foreign key'. What are the principles of NULL
   values in SQL ?   **6**

                                    OR

4. a) Why should you avoid duplication of field in relations ? Is duplication allowed
      in databases ? If yes, under what conditions ?   **4**

   b) What are the various database storage devices ? Explain any two of them ?   **6**

   c) i) Create a table 'client master' with the following columns assuming suitable
         data type and size with correct syntax.   **4**
         client_no, name, address, city, state, pincode.

      ii) Write the correct syntax for adding a new column 'hire_date' to the
          client_master table.   **2**

      iii) Modify the table by changing the field client_no as primary key.   **2**

Unit – III

5. a) Define mathematical modeling. Explain the importance of mathematical modeling
      in engineering applications.   **6**

   b) Define the terms : Algorithm, programming language and computer program.   **6**

   c) What are the characteristics of an Algorithm ? Explain.   **4**

                                    OR

6. a) Explain the following in brief :   **12**
      i) Base band, broad band and carrier band
      ii) Bus topology
      iii) Token ring

   b) What is LAN ? What are the characteristics of LAN ?   **4**

SECTION – II
Unit – IV

7. a) Describe the output that will be generated by the following C-programs : **8**

   i)
```c
#include <stdio.h>
int main ( )
{
        int x = 4, y, z ;
        y = -- x ;
        z = x -- ;
        printf ("%d %d %d \ n", x,y,z) ;
        return 0;
}
```

   ii)
```c
#include <stdio.h>
int main ( )
{
        int fun (int) ;
        int i = fun (10) ;
        printf ("%d \ n", -- i) ;
        return 0;
}
int fun (int i)
{
        return (i++) ;
}
```

   b) Find the root of a function $4.x - e^x = 0$ that lies between 2 and 3 using Newton-Raphson method up - to four decimal places. **8**

              OR

8. a) Solve by Gauss Elimination method the following equations : **8**
   $3.15\ x - 1.96\ y + 3.85\ z = 12.95$
   $2.13\ x + 5.12\ y - 2.89\ z = -8.61$
   $5.92\ x + 3.05\ y + 2.15\ z = 6.88$

   b) Describe the output that will be generated by the following C - programmes : **8**

   i)
```c
#include <stdio.h>
int main ( )
{
        int i = 0 ;
        for (; i <5 ; i ++)
        printf ("% d \ n", i) ;
        return 0;
}
```

ii) #include <stdio.h>
```
int main ( )
{
        int i = –3, j = 2, k = 0, m;
        m = ++i && ++j || ++ k ;
        printf ("%d %d %d %d \ n", i, j, k, m);
        return 0;
}
```

Unit – V

9. a) From the data given below, find the value of x when y = 13.5 using Lagrange's interpolation method. **8**

| **x :** | 93.00 | 96.20 | 100.00 | 104.20 | 108.70 |
| **y :** | 11.38 | 12.80 | 14.70 | 17.07 | 19.91 |

b) Fit a second degree parabola to the following data using the method least squares : **10**

x :	1929	1930	1931	1932	1933	1934	1935
y :	352	356	357	358	360	361	361

OR

10. a) From the table given below, find the best values of a and b in the law $y = a.\ e^{(b.x)}$ by the method of least squares : **8**

| **x :** | 0 | 5 | 8 | 12 | 20 |
| **y :** | 3.0 | 1.5 | 1.0 | 0.55 | 0.18 |

b) Draw a flow chart and pseudo C-program for Newton forward interpolation method. **10**

Unit – VI

11. 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

12. 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**

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T.E. (Production/Production S/W) (Sem. – II) Examination, 2009
## DIE AND MOULD DESIGN
(2003 Course)

Time : 4 Hours   Max. Marks : 100

Instructions *:*   *i) From Section **I** solve, Q. **1** or Q. **2**, Q. **3** or Q. **4**, Q. **5** or*
           *Q. **6** and from Section **II** solve Q. **7** or Q. **8**, Q. **9** or Q. **10**,*
           *Q. **11** or Q. **12**.*
    *ii) Answers to the **two** Sections should be written in **separate***
           answer book.
   *iii) **Neat** diagrams must be drawn **wherever** necessary.*
   *iv) Figures to the **right** indicate **full** marks.*
    *v) **Use** of electronic pocket calculator is **allowed**.*
   *vi) Assume suitable data, if **necessary**.*

SECTION – I

1. Design a blanking die for the component shown in Figure 1.

   i) Draw strip layout and find out material utilization.   **4**

   ii) Find out press tonnage with full shear.   **4**

   iii) Design blanking die and draw the same.   **4**

   iv) Draw neat sketch of press tool.   **6**
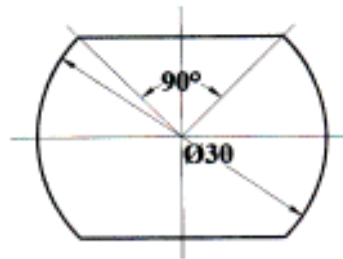
Blank of m.s. sheet 1mm thk
with shear stress =400N/mm²

Fig. 1

      OR

2. Design a progressive die for the component shown in Figure 2(a).
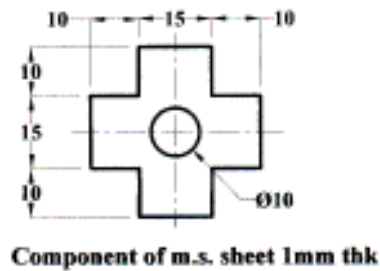

Component of m.s. sheet 1mm thk

Fig. 2(a)

i) Fig. 2(b) shows strip layout for the component in fig. 2(a). Find out material utilization assuming sheet of size 2500 × 1250 × 1 mm. **4**

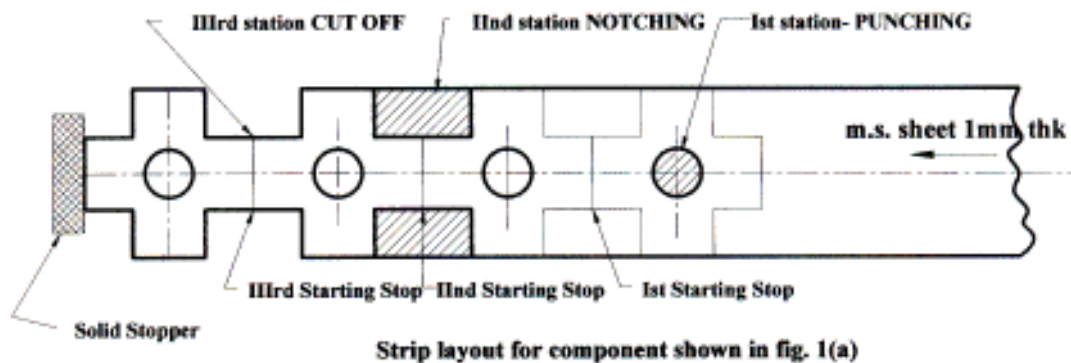Strip layout for component shown in fig. 1(a)

Fig. 2(b)

ii) Calculate cutting force and press tonnage with staggering and full share. Given : shear stress = 400 N/mm². **5**

iii) Draw sketch of fixed stripper showing location for starting stopper. **3**

iv) Draw press tool assembly. **6**

3. Design a drawing die for the shell shown in fig. 3 drawn from CRC sheet of 0.8 mm thickness and UTS = 240 N/mm². **16**

Determine :

 i) Blank size.

 ii) Number of draws.

 iii) Dimension of die and punch and assembly drawing for each draw.

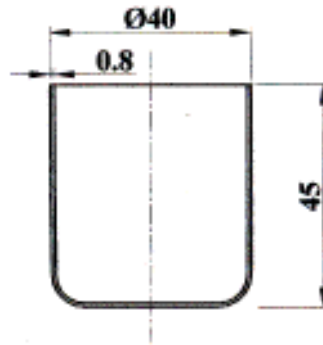 iv) Force required for each draw.

Fig. 3

OR

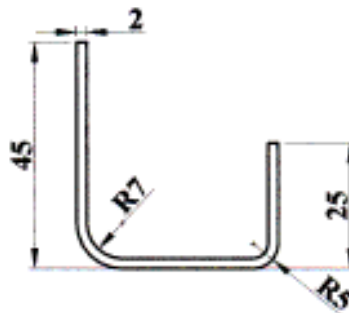4. a) Find out the developed length of the component shown in fig. 4. **6**

Fig. 4

 b) What are the methods of reducing spring back and which would be used for the component in fig. 4. **6**

 c) Find out bending force required for job in fig. 4. **4**
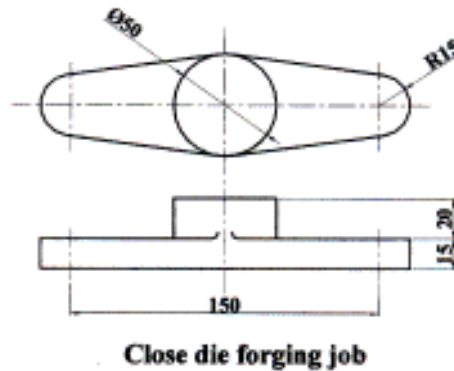
5. Design forging die for the forging shown in fig. 5. **16**

Close die forging job

Fig. 5

OR

6. Design upsetting die for upsetting as shown in fig. 6. **16**
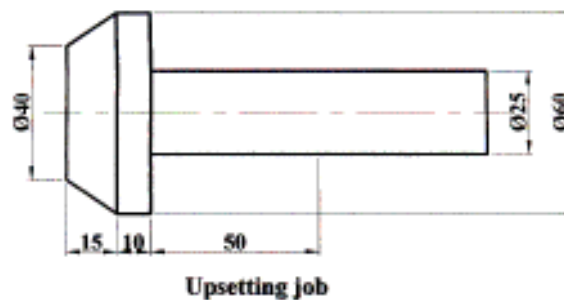

Upsetting job

Fig. 6

SECTION – II

7. a) What are the difference between hot chamber and cold chamber die casting ? **6**

   b) Explain with neat sketch die terminology in die casting. **10**

OR

8. a) Write note on ejection in die casting. **6**

   b) Explain different types of core. **6**

   c) What is mechanical locking mechanism in die casting ? **4**

9. a) Explain injection mould for thermoplastic material. **6**

   b) What do you mean by register ring ? Explain its function with neat sketch. **5**

   c) What is sprue bush ? Explain its two types. **5**

                    OR

10. a) What is bolster ? What are their functions ? What are its different types explain with neat sketch ? **8**

    b) What are the functions of guide pillar and guide bush ? Explain its different types. **8**

11. a) Design an injection mold for the PVC component shown in figure 7. **18**

Injection moulding job

Fig. 7

                    OR

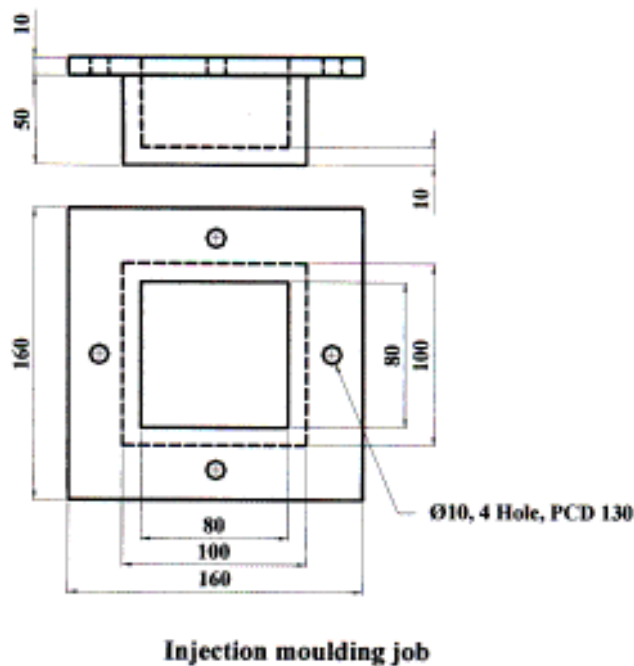12. a) Explain any two types for ejector plate return system. **8**

    b) What is stop pin in injection moulding ? **2**

    c) What rectangular edge gate and 50 mm long runner dimensions are required for moulding PVC box the dimension of which is as follows ?
    Length = 150 mm; width = 130 mm; depth = 50 mm.
    Given ; PVC constant (n) = 0.9; PVC density = 1.39 gm/cm^3. **8**

    _____

T.E. (Production / Production S/W) (Sem. – II) Examination, 2009
MANUFACTURING PROCESSES – II
(2003 Course)

Time : 3 Hours   Max. Marks : 100

*Instructions : 1) Solve **any one** question from every Unit in **each** Section.*

*2) Answer to the **two** Sections should be written in **separate** books.*

*3) Neat diagrams must be drawn **wherever** necessary.*

*4) Figures to the **right** indicate **full** marks.*

SECTION – I
Unit – I

1. a) What is meant by welding electrode ? Classify the welding electrode. Write
   down the selection of electrode for a particular application.   **8**

   b) Explain self-adjusted arc and self-controlled arc method to maintain arc length
      constant in metal inert gas (MIG) arc welding process.   **8**

                         OR

2. a) Compare the Electroslag welding with that of submerged arc welding with respect
      to heat liberation, electrode welding position and application.   **8**

   b) What is meant by plasma arc welding ? Explain Non-transferred arc process
      and transferred arc process in plasma arc welding.   **8**

Unit – II

3. a) Suggest a suitable gas flame used for welding of following material and draw
      sketches and justify it.   **9**

      i) Stainless steel, ii) Zinc base metal, iii) Aluminium

b) Explain a simple resistance spot welding cycle. And also explain the different resistance seen in total resistance of the welding system between the electrodes in resistance welding. **9**

OR

4. a) Explain the following process with respect to : **10**

   i) Principle of operation

   ii) Metal to be welded

   iii) Advantages

   iv) Limitations

   v) Applications.

Process :

A) Percussion welding

B) Butt welding

b) Explain theoxy fuel gas cutting process. How is a gas cutting torch differ from welding torch ? **8**

Unit – III

5. a) Write a note on : **10**
   1) Diffusion welding
   2) Explosive welding

b) Explain the different types of soldering fluxes. **6**

OR

6. a) Explain with neat sketch a thermit welding process along with advantages, limitations and applications. **8**

b) Explain in short any two brazing processes on the basis of method of heating. **8**

SECTION – II
Unit – IV

7. a) What is the ideal profile of sprue ? What are the criteria to be used for designing the pouring basin ? **8**

   b) Calculate the size of cylindrical riser having height and diameter equal, necessary to feed a steel slab casting of size 35×35×10 cm with a side riser, casting poured horizontally into the mold. Given in Caine's equation substitute the values a = 0.1, b = 0.03, c = 1.0. **8**

OR

8. a) What is meant by directional solidification ? Describe in detail various methods of achieving directional solidification of casting. **8**

   b) Define the choke area. Explain how this area is calculated. Draw sketches for different gating system. **8**

Unit – V

9. a) Explain thread grinding with single rib wheel and multirib wheel. State important features of thread grinding over cylindrical grinding. **8**

   b) Explain with a schematic set up for gear cutting on a gear shaper. Write advantages and limitations of this process. **8**

OR

10. a) Write a note on
      i) Automatic tapping machine. **10**
      ii) Thread rolling.

    b) Explain with schematic diagram the set up of hobbing machine for cutting a spur gear. **6**

Unit – VI

11. a) Explain the RC circuit used in EDM M/c. **6**

   b) Explain the influence of accelerating voltage, beam current, and beam diameter on MRR in EBM. **6**

   c) Explain the process plasma arc machining in brief. **6**

OR

12. a) Explain the principle of working of electro chemical process. What materials are used for preparing tools ? How is the profile of the work piece controlled ? **8**

   b) Draw schematic diagram for
      i) Ultrasonic machining
      ii) Electron beam machining.
      Lable the important component in it. Write down the advantages and application of it. **10**

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T.E. Production (Semester – II) Examination, 2009
MACHINE TOOLS AND ADVANCED MANUFACTURING SYSTEMS
(2003 Course)

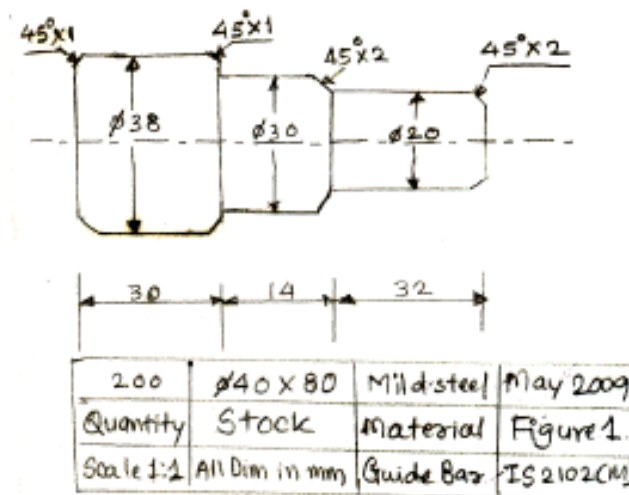Time : 3 Hours   Max. Marks : 100

Instructions *: 1) Answers to the* ***two*** *Sections should be written*
in ***separate*** *books.*
2) ***Neat*** *diagrams must be drawn* ***wherever*** *necessary.*
3) ***Black*** *Figures to the* ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of electronic pocket calculator is* ***allowed****.*
5) ***Assume*** *suitable data,* ***if necessary****.*
6) From Section ***I****, solve Q.* ***1*** *or Q.2, Q.3 or Q.4,*
Q.5. or Q.6 and from Section ***II****, solve Q.7 or Q.8, Q.* ***9*** *or*
Q. ***10****, Q.* ***11*** *or Q.12.*

SECTION – I

1. Referring to Figure, design the set of plate of cams for a single spindle automatic
machine. Assume suitable machining parameters depending upon the type of
material to be machined. Include the information on the chart and draw the
layout for turret cams.   **18**

200	⌀40 X 80	Mild·steel	May 2009
Quantity	Stock	Material	Figure 1.
Scale 1:1	All Dim in mm	Guide Bar	IS 2102(M)

OR

2. A) What factors distinguish between automatic and semiautomatic machine tools ? Give their classification. **6**

   B) With appropriate Figure explain the Geneva mechanism. In a six station Geneva mechanism, the driver rotates at 3 rpm, determine the cycle time of indexing mechanism, process time, time spent by each cycle in indexing the table to the next working position. **6**

   C) Compare single spindle with multi-spindle automat. **6**

3. A) Explain the functions of different components of CNC machine tool. Compare NC/CNC and conventional machine tools on the basis of performance, reliability, production rate and maintenance required and economic factors of machine tools. **8**

   B) Explain with neat diagrams, open loop and close loop circuit employed on CNC machines. **8**

                        OR

4. A) Explain the different feedback devices used for position and velocity control on NC/CNC machines. **8**

   B) Explain how accurate position control is obtained in CNC machine. **8**

5. A) What is micro machining ? Explain any one process of micro machining. **8**

   B) Explain C.V.D. Process variables which affect deposition rate and film properties. **8**

                     OR

6. A) Write short notes on : **8**

   i) Anodizing   ii) Electroplating.

   B) Write briefly on **8**

   i) Plasma coating   ii) Phosphating

SECTION – II

7. A) Discuss the methods of balancing an assembly line using precedence diagram. **8**

   B) A eight station transfer machine has an ideal cycle time of half a minute. The frequency of line stop is 0.060 stop per cycle. When a line stop occurs, the average down time is 5.0 min. Determine :

   i) Average production rate part/hr.
   ii) Line efficiency
   iii) Proportion downtime. **10**

   OR

8. A. Give classification of automated material handling equipments. **4**

   B) Differentiate flow lines having storage buffers with flow lines without storage buffers. **4**

   C) The company is setting a automobile assembly plant to produce 200 units per eight hours shift. The information regarding work elements in terms of times and immediate predecessors are given below. **10**

   What is the desired cycle time and theoretical number of work stations ?

Work element	Time (Sec.)	Immediate Predecessors
A	50	-
B	70	A
C	30	A
D	45	A
E	30	B,C
F	25	D
G	100	E,F
H	120	G
I	130	I

What are the efficiency and balance delay of line ?

9. A) What are different types of Flexible Manufacturing Systems (FMS)?

   What are the considerations done in effective planning in FMS ? **8**

   B) Explain with neat diagram, Computer Integrated Manufacturing Systems (CIMS). **8**

                      OR

10. A) What are the different types of flexibilities considered in manufacturing systems ?
    Explain the techniques of performing simulation of manufacturing systems. **8**

    B) What are the different configurations of robots ? Explain the terms used.

       i) Work volume   ii) Degree of freedom

       iii) System accuracy   iv) Precision movement. **8**

11. A) What are the types of maintenance policies practiced in manufacturing industries ?
    Explain in brief about total productive maintenance. **8**

    B) Write a short note on :

       i) Coolant type and selection

       ii) Chip removal system. **8**

                      OR

12. A) Describe the factors which affect the quality and performance of NC/CNC machines. **8**

    B) What are the installation considerations in designing of machine tools ?
    What are the contents in the operator's manual of CNC machine tools ? **8**

_____

T.E. (Production/ Production S/W) (Semester – I) Examination, 2009
METAL CUTTING AND TOOL DESIGN
(2003 Course)

Time: 3 Hours   Total Marks: 100

Instructions : *1) Attempt **one** question from **each** Unit from Section – **I** and*
*Section – **II***
*2) Answers to the **two** Sections should be written in **separate***
answer books.
*3) **Neat** diagram must be drawn **whenever** necessary.*
*4) Figures to the **right** indicate **full** marks.*

SECTION – I
Unit – I

1. a) List the various types of chips produced during metal cutting. Describe the
conditions in which these types of chips are produced.   **6**

   b) Sketch merchant's circle of forces, and name the various components of forces
and angles involved.   **6**

   c) In an orthogonal cutting the following observations were made.   **6**

   Cutting speed = 100 m/min

   Rake angle = 10°

   Cut chip thickness = 0.228

   Uncut chip thickness = 0.125

   Cutting force = 550 N

   Thrust force = 220 N

   Calculate shear angle, friction angle, power consumed.

                OR

2. a) What is the function of cutting tool dynamometer ? Explain with suitable sketch anyone cutting tool dynamometer of your choice. **8**

    b) A pipe 38 mm in diameter is being turned on a lathe with a tool having a rake angle of 12° and a feed of 0.15 mm/ rev. The length of chip over one revolution of work piece is 70 mm. The cutting speed is 15 m/min. The tangential force is 400 N and feed force 170 N. Calculate

      i) Coefficient of friction on the rake force. **10**
      ii) Thickness of chip
      iii) Angle of shear
      iv) Velocity of shear
      v) Velocity of chip along the tool face.

Unit – II

3. a) Write a short note on : **10**
      i) Cutting tool materials
      ii) Heat treatment of tools.

    b) What is the function of Reamer ? Name different types of reamers and explain any one in detail. **6**

OR

4. a) Draw only sketches for tooling systems for turning tools with mechanically clamped indexable inserts and labled on it. **9**

    b) Explain with neat sketch a tool signature in ASA system. **7**

Unit – III

5. a) Write a note on : **10**
      i) Tool wear
      ii) Factors affecting on tool life.

    b) In a turning operation, it was observed that the tool life was 150 min when the cutting speed was 20 m/min. As the speed was increased to 25 m/min tool life dropped to 45 min. If the time required to change the tool was 2 min and if the cost of regrinding the tool was ten times the cost of turning/ min. Calculate i) the most economical cutting speed ii) tool life for maximum production. **6**

OR

6. a) Prove that $\left[T = \left(\dfrac{1}{n} - 1 \right) k_2 \right]$ where T = tool life for maximum production,

   n = exponent in the tool life equation, K_2 = tool changing time. **6**

   b) What is machinability ? What are different criteria for machinability assessment ? Explain different factors affecting machinability. **10**

SECTION – II
Unit – IV

7. a) Explain design procedure for turning tool for strength and rigidity consideration. **6**

   b) A key way is to be broached in the bore of a low alloy steel gear. Design a broach with following data : **10**
   - Bore diameter = 40 mm
   - Bore length = 60 mm
   - Width of key way = 5 mm
   - Depth of key way = 3 mm
   - Rise per tooth = 0.02 mm
   - Finishing teeth = 4
   Draw sketch for designed broach.

OR

8. a) With a neat sketch explain the various design aspect of a plain milling cutter. **8**

   b) With suitable example explain design of circular form tool by graphical method only. **8**

Unit – V

9. a) What is an indexing jig ? Describe the various indexing devices commonly used with suitable sketches. **8**

   b) Write short notes on : **8**
   i) standardisation of jig and fixtures.
   ii) universal jig.

OR

10. a) What are the different requirements of locating elements ? **6**

   b) Discuss the principle of perpendicular locating planes. **5**

   c) Discuss the different elements of jig and fixtures. **5**

Unit – VI

11. a) Design a drill jig for drilling a hole of size ϕ 14 and ϕ 16 mm for the component shown in fig. No.1. **18**

OR

12. a) Design a milling fixture to mill the face A and face B to maintain dimension $55^{+0.0}_{-0.1}$ for the component shown in fig. No.1 **18**
   Draw minimum two views of your design. Show the component in position, name all important elements on your drawings.
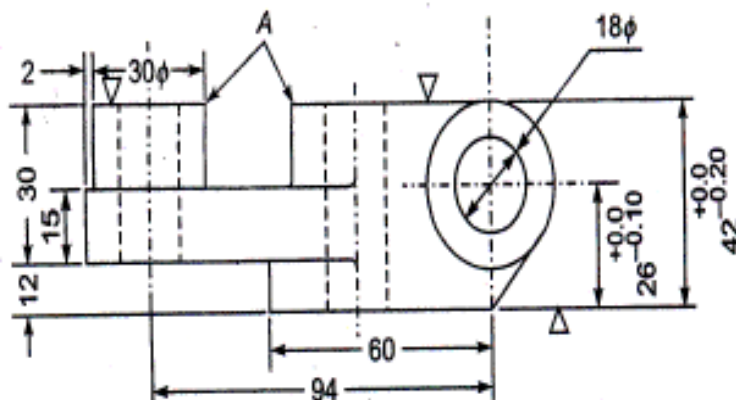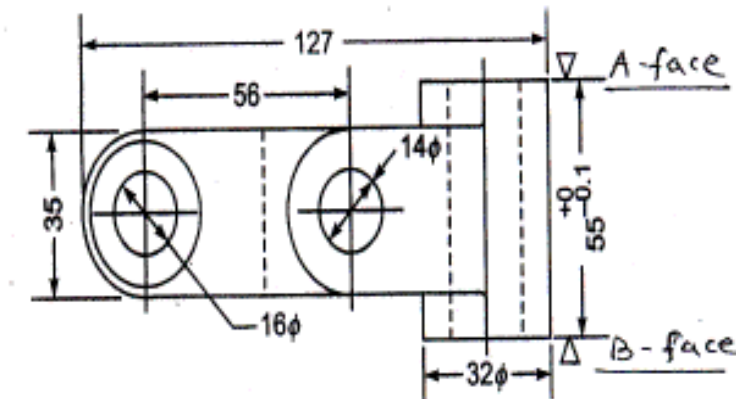

fig. No. 1

T.E. Production (Sem. – I) Examination, 2009
PRODUCTION PLANNING AND CONTROL
(2003 Course)

Time : 3 Hours　　　　　　　　　　　　　　　　　　Total Marks : 100

Instructions. *: 1) Answer **any three** questions from each Section.*
　　　　　　　　*2) Answers to the **two** Sections should be written in **separate** books.*
　　　　　　　　*3) **Neat** diagrams must be drawn **wherever** necessary.*
　　　　　　　　*4) Black figures to the **right** indicate **full** marks.*
　　　　　　　　*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

1. a) Explain with block diagram functions of PPC.　　　　　　　**9**

　b) What is the integrated approach towards PPC ?　　　　　　　**9**

　　　　　　　　OR

2. a) Explain following production system :
　　i) Make to stock
　　ii) Make to order
　　iii) Assemble to order.　　　　　　　　　　　　　　　　　**9**

　b) What are the objectives of PPC ? Explain essential information required for production planning.　　　　　　　　　　　　　　　**9**

Unit – II

3. a) How sales forecasting methods classified ? Explain any two in brief.　**8**

　b) An investigation into the demand for Maruti Swift Desire in 7 towns resulted into following data :

Population of town (in lakh)	7	11	13	16	19	21	23
No. of Maruti Swift Desire Demanded (in thousands)	05	06	08	10	12	14	16

Fit a linear regression and estimate the demand for Maruti Swift Desires for the towns with population of 20 and 27 lakhs.　　　　　　　　**8**

　　　　　　　　OR

P.T.O.

4. a) Explain various Demand pattern used in sales forecasting. **8**

   b) The following data contains sales of a particular product for 6 weeks and forecast of 1st week is given :

Week	1	2	3	4	5	6
Actual Demand	85	88	82	83	89	88
Forecast	82					

   i) Calculate forecast for remaining six months using single exponential smoothing with $\alpha = 0.2$. **4**

   ii) Calculate MAD (Mean Absolute Deviation) and BIAS for the forecast. **4**

Unit – III

5. a) Define Production Control and explain outline functions of Production Control. **8**

   b) What is Process Planning ? With the help of block diagram explain Process Engineer's Frame work. **8**

OR

6. a) Explain briefly the concept of Line of Balance. **8**

   b) Explain Gantt charts used in process planning with suitable example. **8**

SECTION – II
Unit – IV

7. a) With the help of block diagram explain inputs and outputs of MRP – I. **8**

   b) What are different documents used in purchase development ? Explain any two in detail. **8**

OR

8. a) Explain CRP-Capacity Requirement Planning with its inputs, outputs and block diagram. **8**

   b) Explain how a company has to take decision for make or buy ? **8**

Unit – V

9. a) With your own example explain ABC analysis in detail. **8**

b) Annual demand for CNC machine is 40000 units. The carrying cost is Rs. 10/ unit/year. The ordering cost is Rs. 40/-per order and the shortage cost is Rs. 15/-per unit/year. Find optimal values of the following :

  i) Order quantity. **2**

  ii) Cycle time. **2**

  iii) Maximum level. **2**

  iv) Represent the system graphically. **2**

<div align="center">OR</div>

10. a) Explain what is stock out cost ? Why stockout occurs in Industry ? **8**

b) A manufacturer buys items in lots of 800 units which is 6 months requirements. The cost per unit is Rs. 100/- and ordering cost is Rs. 220/-per batch order. The inventory carrying cost is estimated at 20% of the average inventory investment.

  i) Find EOQ. **2**

  ii) What is the Annual Total Cost of existing policy ? **3**

  iii) How much inventory can be saved by using economic order quantity (EOQ) ? **3**

Unit – VI

11. a) Why industry has to go for stock taking ? Explain what are the different methods of stock taking (stock verification). **9**

b) What are the advanatges of good stores keeping ? **4**

c) Explain any one documents used in stores and list out minimum four documents used in stores. **5**

<div align="center">OR</div>

12. a) Explain in detail JIT system used in industry. **9**

b) Explain different factors considered in store design. **5**

c) Explain waste/scrap management in brief. **4**

_____

T.E. (Production) (Sem. I) Examination, 2009
MATERIAL FORMING
(2003 Course) (Common with Prod. S/W)

Time : 3 Hours   Marks : 100

Instructions : 1) *Answer **any three** questions from **each** Section.*
2) *Answers to the **two** Sections should be written in **separate** books.*
3) *Neat diagrams must be drawn **wherever** necessary.*
4) *Black figures to the **right** indicate **full** marks.*
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 – 1

1. a) Explain principal factors affecting plastic deformation.   **8**

   b) The state of stress at a point is given by   **8**

   σ_x = 70 MPa

   σ_y = 120 MPa

   $\Im_{xy}$ = 35 MPa

   if the yield strength for the material is 125 MPa. State in a uniaxial tensile test, yielding will occur according to Tresca's or Van-Mises yielding conditions.

                    OR

2. a) Explain the effect of strain rate on the yield stress. Explain Cam-operated plastometer with neat sketch.   **8**

   b) A tensile specimen with a 12 mm initial diameter and 50 mm gage length reaches maximum load at 90 KN and fractures at 70 KN. The minimum diameter at fracture is 10 mm. Determine the engineering stress at maximum load and the true fracture stress.   **8**

Unit – 2

3. Explain the following : **18**

   i) Effect of grain flow lines in forging

   ii) Powder forging

   iii) Orbital forging.

<p align="center">OR</p>

4. Explain the following : **18**

   i) Isothermal forging and its advantages

   ii) Metallurgy of forging

   iii) Upsetting.

Unit – 3

5. Derive an equation for the drawing stress induced during tube drawing operation using fixed tapered plug. **16**

<p align="center">OR</p>

6. a) Calculate the maximum reduction per pass in a wire drawing operation considering die angle $= 18°$ and coefficient of friction $= 0.12$. **8**

   b) Explain various types of wire drawing machines. State their advantages and limitations. **8**

<p align="center">SECTION – II</p>

Unit – 4

7. a) Explain various types of series used in roll pass sequence. Give a proper roll pass sequence to produce a circular bar from square bloom. **10**

   b) Explain AGC and state various methods of AGC. **8**

<p align="center">OR</p>

8. A steel strip of size, thickness 100 mm × width 140 mm × length 1000 mm is rolled in rolls of diameter 600 mm with reduction of 20%. The coefficient of friction is 0.35. The roll rotate at speed 160 rpm. Determine : **18**

   i) Arc contact length

   ii) Angle of bite

   iii) Ratio of neutral section thickness to final thickness

   (Assume rear tension coefficient = 0.892 and front tension coefficient = 1)

   iv) Neutral angle

   v) Forward slip.

Unit – 5

9. a) Sketch a horizontal extrusion press. List the auxilary equipments required in extrusion plant. **8**

   b) Explain types of impact extrusion with neat sketch. State their applications. **8**

OR

10. a) Explain the following terms : **8**

   i) CCD

   ii) Shape factor

   iii) Form factor

   iv) Extrusion ratio and extrudability.

   b) Explain Hydraustatic extrusion and explosive extrusion with neat sketch. **8**

Unit – 6

11. a) Explain various types of materials used for making dies in explosive forming. State different factors to be considered while selecting the die materials. **8**

   b) Explain stretch forming process with neat sketch. **8**

OR

12. a) Explain important process variables of explosive forming process. **8**

   b) Explain Dynapak High speed forming machine with neat sketch. **8**

—————————

T.E. (Production/Prod. S/W) (Sem. – I) Examination, 2009
KINEMATICS AND DESIGN OF MANUFACTURING MACHINES
(2003 Course)

Time : 4 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 books**.*
*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**.*

SECTION – I
Unit No. – 01

1. a) Explain various Kinematics principles used in the operation of gear hobbing machine used to generate helical gear. **10**

   b) Explain the following terms related to Kinematic Synthesis.

      i) Function Generation

      ii) Path Generation

      iii) Body Guidance (Motion Generation). **6**

                OR

2. a) In four bar mechanism, the link AD is fixed link and the dimensions of the various links are as follows :

   AB = 60 mm, BC = 200 mm, CD = 140 mm, AD = 210 mm.

   The crank AB has an angular velocity of 30.13 rad/sec in the anticlockwise direction and retardation of 24 rad/s^2. When the input link is inclined at an angle of 30°, find :

      i) Angular displacement of the link CD.

      ii) Angular velocity of link CD. **10**

   b) Explain the following Kinematic chain representation with figure:

      i) E-21   ii) C-12   iii) K- 23   **6**

Unit No. – 02

3. a) Explain the significance of fatigue stress contraction factor and the notch sensitivity. **4**

   b) Explain the Modified Goodman diagram for fluctuating Torsional shear stresses. **4**

   c) A cantilever beam of rectangular cross section is fixed at one end and subjected to a completely reversed force of 2.5 KN at the free end. The force is perpendicular to the axis of the beam. The distance between the free and fixed ends is 400 mm. The beam is made of steel with ultimate tensile strength of 540 N/mm² and tensile yield strength of 320 N/mm². The theoretical stress concentration factor and notch sensitivity at the fixed end are 1.4 and 0.8 respectively. The beam operates at the temp of 100°C for which temp. factor is 1.020. The size factor, surface finish factor and reliability factors are 0.85, 0.8 and 0.868 respectively. The depth of the beam is 1.25 times the width of the beam. If the required factor of safety is 2.0, determine the cross sectional dimensions of the beam for :

   i) Finite life of 40,000 cycle and

   ii) Infinite life. **8**

OR

4. a) Determine the maximum load using Soderberg's criterion for simply supported beam, cyclically loaded as shown in figure. Assume surface finish factor as 0.90, size factor 0.85. The beam material has ultimate tensile strength of 500 MPa and yield strength of 350 MPa, factor of safety is 1.5 and diameter of beam 35 mm. **8**
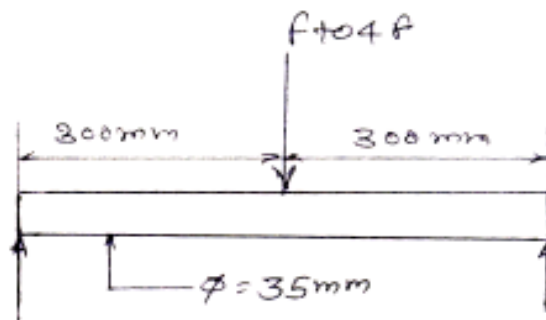

Figure - Q. 4 (a)

b) A steel bar is subjected to two dimensional stresses, the tensile stress along the X-axis varies from 40 MPa to 90 MPa, whereas the tensile stress along the Y-axis varies from 10 MPa to 75 MPa. The corrected endurance strength of the component is 250 MPa. The ultimate strength is 650 MPa. Determine the factor of safety by maximum distortion energy theory. Use Goodman's fatigue criterion for failure. **8**

Unit No. – 03

5. a) What do you mean by formative number of teeth in helical gear ? Derive the relationship. **5**

b) Show 3-dimensionally the various forces acting on a Helical Gear tooth. **3**

c) A pair of spur gears with 20° full depth involute teeth consists of 21 teeth pinion running at 720 rpm. in mesh with a gear running at 378 rpm. The centre distance is 152.5 mm. The pinion is made of alloy steel $S_{ut} = 700$ N/mm^2 , while the gear is made up of plain carbon steel 40C8 ($S_{ut} = 580$ N/mm^2). The gear pair is heat treated to a surface hardness of 400 BHN. Face width of gears is 12 times the module. The service factor and factor of safety are 1.25 and 1.5 respectively. The gear pair is manufactured by hobbing. Assuming the velocity factor accounts for dynamic load, calculate :

   i) Beam strength

   ii) Wear strength

   iii) Maximum static load that gear pair can transmit

   iv) The rated power

   v) Dynamic Load by Spott's equation.

Use following design data :

For grade 7 $\rightarrow$ e = 11.0 + 0.9[m + 0.25 $\sqrt{d}$]

$$K_V = \frac{6}{6+V}, \; Y = 0.484 - \frac{2.87}{Z}$$

$$F_d = \frac{e.n_p.Z_p}{2527} \frac{b.r_p.r_g}{\sqrt{r_p^2 + r_g^2}} \times \cos \varphi$$

(Notations have usual meaning) **10**

OR

6. a) i) State purpose of providing lubrication in Gear box.

    ii) State different types of lubricant used.

    iii) State modes of lubrication. **9**

  b) A pair of helical gears consists of 20 teeth right hand pinion meshing with 50 teeth, left hand gear. The pinion rotates at 3000 rpm and transmits 7.5 kW power to the gear. The normal module is 4 mm and normal pressure angle is 20°. The helix angle is 23°. The pinion is above the gear and is rotating in clockwise direction when viewed from the right side. Determine the components of force acting on meshing teeth and draw a free body diagram showing the forces acting on the pinion and the gear. **9**

SECTION – II
Unit No. – 04

7. a) What do you mean by bearing with probability of survival other than 90 percent ? Explain. **3**

  b) Write short note on lubrication of rolling contact bearing. **5**

  c) A ball bearing operates on a work cycle consisting of three parts, a radial load of 4000 N at 700 rpm for 30 percent of the cycle, a radial load of 6000 N at 1440 rpm for 40 percent of the cycle and a radial load of 5000 N at 900 rpm for the remaining part of the cycle. The basic dynamic capacity of the bearing is 35700 N.

    Calculate :

    i) the rating life of the bearing in hrs.

    ii) the average speed of rotation and

    iii) the life of the bearing in hours with 95% reliability. **8**

              OR

8. a) Describe the different materials used for sliding contact bearings. Which bearing materials are recommended for the main bearings of heavy duty diesel engines ? Why ? **6**

b) The following data is given for a belt drive :

Diameter of the pulley	–	300 mm
Shaft diameter	–	25 mm
Power transmitted	–	7.5 kW
Speed	–	720 rpm
Ratio of belt Tension	–	3:1

Calculate the dynamic load carrying capacity for radial deep groove ball bearing for a life of 10,000 hrs. Assume the pulley to be placed centrally with the belt tensions acting vertically downwards. The load factor can be taken as 3. **10**

Unit No. – 05

9. a) Discuss design considerations for manufacture of connecting rod. **4**

b) What do you understand by 'aesthetic feeling' ? Explain the various aspects which contributes to the aesthetic appeal of the product ? **6**

c) A shaft fitted with a flywheel rotates at 250 rpm and drives a machine. The torque of machine varies in a cyclic manner over a period of 3 revolutions. The torque rises from 750 Nm to 3000 Nm uniformly during ½ revolution and remains constant for the following revolution. It then falls uniformly to 750 Nm during the next ½ revolution and remains constant for one revolution, the cycle being repeated thereafter. The safe centrifugal stress is 6 MPa. The material density may be assumed as 7200 Kg/m³. Determine the power required to drive the machine, diameter of flywheel and draw turning moment diagram for complete cycle. **8**

OR

10. a) What is significance of parting line in forging ? What factors affects selection of parting line ? **6**

b) Distinguish between 'Machine Design' and 'Ergonomic Design'. **6**

c) Derive the expression for tensile stress induced in the flywheel rim. **6**

Unit No. – 06

11. a) In Johnson's method of optimum design how you will construct primary design equation, subsidiary design equation and limit equation ? Explain with suitable example.   **8**

   b) An assembly of three components A, B and C is shown in figure. The dimensions of the three components are normally distributed and natural tolerance is equal to design tolerance as shown in figure. Determine the percentage of assemblies where interference is likely to occur.
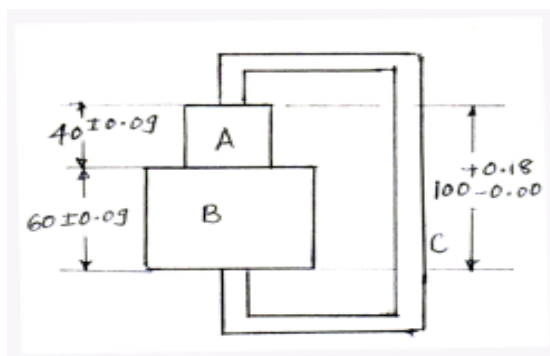
Figure - Q. 11 (b)

Areas below the standard normal distribution curve are.

Z	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
Area	0.3849	0.4032	0.4192	0.4332	0.4452	0.4554	0.4641	0.4713	0.4772

Assume linear interpolation for intermediate values.   **8**

OR

12. a) What do you understand by sampling distribution ?   **4**

   b) Explain the method of optimum design for redundant specification in short.   **6**

c) An assembly of two Components A and B with an overall dimensions of 40 ± 0.9 mm is shown in figure. The overall dimensions as well as the dimensions of individual components are normally distributed and natural tolerances are equal to design tolerances. Specify the dimensions for Component B. **6**

Figure - Q. 12 (c)

T.E. (Production Engg.) (Sem. – I) Examination, 2009
MATERIAL SCIENCE AND COMPOSITE MATERIALS
(2003 Course)

Time : 3 Hours   Max. Marks : 100

Instructions *: 1) Answer Q. **1** or **2**, Q. **3** or **4**, Q. **5** or **6** questions from*
*Section – **I**.*
*2) Answer Q. **7** or **8**, Q. **9** or **10**, Q. **11** or **12** questions from*
*Section – **II**.*
*3) Answers to the **two** Sections should be written in **separate** books.*
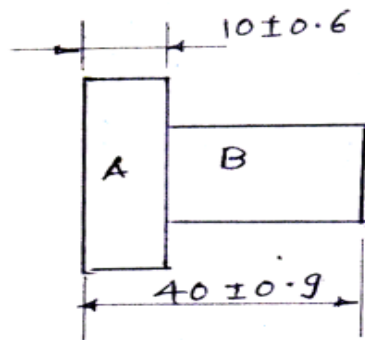*4) **Neat** diagrams must be drawn **wherever** necessary.*
*5) Black figures to the **right** indicate **full** marks.*
*6) **Use** of logarithmic tables, slide rule, Mollier charts, electronic*
*pocket calculator and steam tables is **allowed**.*

SECTION – I

1. Answer the following :

   1) What are the advantages of electrolytic polishing ? When it is not suitable ? **4**

   2) Write all reactions of Fe - Fe_3C equilibrium diagram. What do you understand
      by A_1, A_3, and A_{cm} ? **6**

   3) What are Flow lines ? How are they developed ? What do they indicate ? **6**

   4) Define – Austenite and Pearlite. **2**

                              OR

2. a) Draw microstructure of AISI 1040 steel. Calculate amounts of phases present
      in it, assuming equilibrium cooling conditions. Write the effects of non-equilibrium
      cooling on Fe - Fe_3C equilibrium diagram. **6**

   b) What do you understand by (any 6) resolving power, Ferrite, Fe_3C, Austenite,
      Total Magnification, Numerical Aperture, FeE 200 K, T 75 W 18 Cr 4 VI, C40. **6**

   c) Explain with a suitable graph, how mechanical properties of plain carbon steel
      vary with %C. **6**

3. Answer the following :   16

   1) Distinguish between CCT and TTT diagram.

   2) What is hardenability ? Explain the factors influencing hardenability.

   3) Explain advantages of salt bath furnace.

   4) In which heat treatment components crack ? Why ? How cracking can be reduced ?

                         OR

4. Answer the following :   16

   1) Normalised steel is harder than annealed steel. Why ?

   2) Explain secondary hardening and temper embrittlement.

   3) With a suitable graph, explain how properties vary during tempering.

   4) Compare isothermal annealing with full annealing.

5. Attempt the following :   16

   1) Explain ausfarming in detail.

   2) Compare nitriding and carburising.

   3) How carburised parts are heat treated ? Explain in detail.

   4) What are the limitations of flame hardening ?

                         OR

6. Write short notes on :   16

   1) Induction Hardening

   2) Cyniding

   3) Patenting

   4) Austempering.

SECTION – II

7. 1) White cast iron finds limited applications in engineering industry. Explain this with its microstructure. **4**

2) How Malleable cast iron is obtained ? State 2 applications of it. **6**

3) Which alloy / tool steel would you suggest for the following applications ? Justify your choice (**any 3**) : **6**
   i) Containers in food industry
   ii) Master gauges
   iii) Wrist watch
   iv) Die casting die for aluminium alloy.

OR

8. Answer the following : **6**

1) How S.G. iron is produced ? Draw its microstructure and explain why it possesses best combination of mechanical properties in cast iron family.

2) Which alloy / tool steel would you recommend for the following applications (**any 3**). Justify your choice. **6**
   i) Plastic molding die
   ii) Surgical instruments
   iii) Milling cutter
   iv) Extrusion die for steel.

3) Explain Sensitization. Is it desirable ? **4**

9. 1) What are the requirements of a bearing material ? **4**

2) State one property, composition and one application of the following (**any 4**) : **12**
   i) LM 6   ii) In Var
   iii) Muntz metal   iv) Constantan
   v) Gun metal   vi) Monel
   vii) Aluminium bronze   viii) Haste alloy.

3) What is Dezincification ? **2**

OR

10. 1) Explain modification treatment in brief. **4**

    2) What is season cracking ? How it is eliminated ? **4**

    3) Suggest suitable non-ferrous material for the following and justify (**any 5**). **10**
       i) Permanent magnet
      ii) Bearing for air craft
     iii) Coins
     iv) Bellows
      v) Costume Jewellery
     vi) Marine hardware
    vii) Piston
   viii) Pressure cooker plug
     ix) Cartridge cases
      x) Automobile casting.

11. Answer the following (**any 4**) : **16**

    1) What are the effects of fiber orientation tensile strength of fiber reinforced composite ?

    2) How carbon fibers are produced ?

    3) What are Bimetallics ? How they are produced ?

    4) Explain Yarn, Tow, Mat, Staple.

    5) Describe, ISO stress and ISO strain condition.

            OR

12. Answer (**any 4**) of the following : **16**

    1) What is Biocompatibility ? Which material would you suggest for hip prosthesis ?

    2) What are MMCs ? Explain in brief.

    3) What is an aramid fiber ? Name 2 commercially available aramid fibers.

    4) How Boron fibers are produced ?

    5) Explain any one production technique of fiber reinforced composite.

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T.E. (Prod./SW) Examination, 2009
BEHAVIOURAL SCIENCE
(1997 Course)

Time : 3 Hours   Max. Marks : 100

Instructions : *1) From Section – **I** Q. No. **4** is compulsory and from*
*Section – **II** Q. No. **8** is **compulsory**.*
*2) From the remaining solve **any two** questions from **each** Section.*

SECTION – I

1. a) Discuss the external factors influencing an industrial enterprise.   **8**

   b) Discuss the environment in urban and rural sectors for setting an industrial
   enterprise.   **8**

2. a) What is an organisation ? Discuss in brief any 3 types of organisation structures.   **8**

   b) Discuss the relation of production dept with   **8**
      i) Sales
      ii) Finance
      iii) Personnel
      iv) Materials.

3. a) What is motivation ? Discuss different types of motivators.   **8**

   b) Discuss Maslow theory of need hierarchy and compare it with two factor theory.   **8**

4. Write short notes on **any three** :   **18**
   i) Personality traits
   ii) Organisational theories
   iii) Learning curve
   iv) Purpose of an industrial enterprise
   v) Need of Industrial laws.

SECTION – II

5. a) What are formal and informal groups ? Discuss the effect on these on performance of an enterprise. **8**

   b) Define conflict. Discuss the nature and causes of conflicts. **8**

6. a) Define the term 'Leadership'. Discuss different leadership styles. **8**

   b) 'Leader has to be born' – Comment. **8**

7. a) Define and explain the process of communication. What are the types of communication ? **8**

   b) Discuss the process of Interviews. Which are different types of interviews ? **8**

8. Write short notes on (**any three**) : **18**
   i) Transactional analysis
   ii) Group dynamics
   iii) Managerial grid
   iv) Barriers in communication
   v) Resolution of conflict.

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T.E. (Production Engg.) (Sem. – II) Examination, 2009
METROLOGY AND QUALITY CONTROL
(2003 Course)

Time : 3 Hours   Max. Marks : 100

Instructions : *1) Answer **Q.1** or **2**, **Q. 3** or **4**, **Q. 5** or **6** from Section- **I**,*
* **Q 7** or **8**, **Q. 9** or **10**, **Q 11** or **12** from Section - **II**.*

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

*3) **Neat** diagrams must be drawn **wherever** necessary.*

*4) Black figures to the **right** indicate **full** marks.*

SECTION – I

1. A) Describe following types of errors in measurement.
   i) Static errors
   ii) Instrument loading errors.   **8**
   B) What is wavelength standard ? What are its advantages ?   **8**

OR

2. A) State the difference between sine bar and sine centre and state their applications.   **8**
   B) Describe constant deviation prism.   **8**

3. A) State Taylor's principle of design and its limitations while designing Go and No go gauges.   **8**

   B) Define :
   i) Straightners
   ii) Parallelism
   How are they measured ?   **8**

OR

4. Design the general type Go and No-Go gauge for components having 20 H_7 f_8 fit. Given.
   i) i(microns) = 0.45 $\sqrt[3]{D}$ + 0.001 D
   ii) Upper deviation of 'f' shaft = – 5.5 $D^{0.41}$
   iii) IT7 = 16i
   iv) IT8 = 25 i
   v) Wear allowance 10 % of gauge tolerance.   **16**

5. A) State various methods of gear tooth thickness measurement and describe any one.   8

   B) Draw floating carriage micrometer and describe its working.   10

                              OR

6. A) Write short notes on (**any three**) :   18

      i) Surface texture and lay

      ii) Tool makers microscope

      iii) Profile projector

      iv) NPL flatness interferometer.

SECTION – II

7. A) Describe concept of TQM and comment on its implementation.   8

   B) What is 'KAIZEN' ? Also explain 5 S system.   8

                              OR

8. A) Describe failure mode and analysis concept and its application by suitable example.   8

   B) Write note on Taguchi method related to design of experiment.   8

9. A) Write note on development of quality management systems.   8

   B) Explain :
      i) ISO 14000 standards concepts
      ii) Malcom Baldrige award.   8

                              OR

10. A) Write note on ISO 9001 : 2001 standards series.   8

    B) Comment on management responsibility for implementation of QMS.   8

11. A) Differentiate between cost of quality and value of quality.   6

B) A cable insulating manufacturing company wants to monitor diameter of cable insulators. 25 samples are observed, sample size = 4. The diameters are as follows.

Sample No.	X_1	X_2	X_3	X_4
1	4.9	4.8	5.1	5.4
2	5.0	5.8	5.3	5.3
3	4.4	4.7	4.8	4.6
4	4.6	5.8	5.4	4.9
5	5.2	5.3	6.1	5.2
6	5.0	5.9	5.8	4.8
7	4.3	4.6	4.7	4.5
8	4.9	4.9	5.5	5.7
9	5.9	6.4	6.1	6.5
10	5.3	5.9	6.1	4.8
11	4.6	4.6	4.3	5.0
12	5.3	5.8	5.4	5.1
13	4.9	5.3	5.2	5.7
14	5.2	5.4	4.6	5.5
15	5.4	4.8	4.2	5.1
16	4.6	4.4	4.9	5.1
17	5.7	5.4	5.0	4.8
18	5.1	4.3	5.7	5.8
19	5.9	6.4	6.2	6.1
20	5.0	5.1	4.5	4.8
21	4.9	5.9	5.3	5.2
22	5.4	5.9	4.9	5.0
23	5.2	4.7	5.7	5.8
24	4.0	4.8	5.1	5.8
25	5.3	5.8	6.0	6.3

Is the process under control ? If the process is not stable, what necessary action would you recommend ?

Given $A_2 = 0.729$, $D_3 = 0$, $D_4 = 2.282$, $d_2 = 2.059$. **12**

12. A) Distinguish between process capability (Cp) and process capability index (Cpk) **8**

B) A process that produces bearing housing is controlled with fraction non-conforming chart using sample size n = 100 and a centre line $\bar{p} = 0.02$

   a) Find 3 σ limits for this chart.

   b) Analyse the 10 new samples (n =100) shown below for statistical control. What conclusion can you draw about the process now ? **10**

Sample No.	No. of non – confirming
1	5
2	2
3	3
4	8
5	4
6	1
7	2
8	6
9	3
10	4