

Reg. No. : .....

Name : .....

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

**PT 2K6/2K6 CE/ME/EE/EC/CS/IT/AEI 401 : ENGINEERING  
MATHEMATICS – III**

Time: 3 Hours

Max. Marks: 100

1. a) Given  $f(z) = \begin{cases} \frac{x^3(1+i) - y^3(1-i)}{x^2 + y^2}, & \text{if } z \neq 0 \\ 0, & \text{if } z = 0 \end{cases}$

Show that  $f(z)$  satisfies C – R eq<sup>ns</sup> at the origin.

- b) Show that real and imaginary parts of an analytic function are harmonic.
- c) Verify Cauchy's theorem for the function  $f(z) = ze^{-z}$  over the unit circle with origin as the centre.
- d) Find the residue of the function  $f(z) = z/(z + 1)(z - 2)^2$  at
- i)  $z = -1$
  - ii)  $z = 2$ .
- e) In a partially destroyed laboratory record of correlation data, the following results only are available variance of  $x$  is 9, Regression equations are  $4x - 5y + 33 = 0$ ;  $20x - 9y = 107$ . Calculate :
- i) the mean values of  $x$  and  $y$
  - ii) standard deviation of  $y$



f) The probability that A, B, C hit a target are respectively  $\frac{1}{6}$ ,  $\frac{1}{4}$  and  $\frac{1}{3}$ . Each shoot once at the target. If only one hits the target what is the probability that it was A.

g) Solve  $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$  by method of separation of variables.

h) Solve  $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2}$  which satisfies the conditions  $u(0, y) = u(l, y) = u(x, 0) = 0$

and  $u(x, a) \geq \sin \frac{nhx}{l}$ . (5×8=40)

2. a) i) If  $f(z)$  is a regular function of  $z$  show that  $\left\{ \frac{\partial}{\partial x} |f(z)| \right\}^2 + \left\{ \frac{\partial}{\partial y} |f(z)| \right\}^2 = |f'(z)|^2$ . 8

ii) Find the BLT which maps the points  $z = 0, 1, \infty$  into the points  $w = -5, -1, 3$  respectively. What are the invariant points in this transformation? 7

OR

b) i) Discuss the transformation  $w = z + \frac{k^2}{z}, z \neq 0$ . 10

ii) Construct the analytic function whose real part is  $r^2 \cos 2\theta$ . 5

3. a) i) Evaluate  $\int_C \bar{z} dz$  where  $C$  is

1) the straight line from  $-i$  to  $i$ .

2) the right half of the unit circle  $|z|=1$  from  $-i$  to  $i$  7

ii) Evaluate  $\int_C \frac{l^z}{(z^2 + h^2)^2} dz$  where  $C$  is  $|z|=4$  using Cauchy's integral formula. 8

OR



b) i) Expand  $f(z) = \frac{1}{(z-1)(2-z)}$  as a Laurent series valid for

1)  $|z| < 1$

2)  $1 < |z| < 2$ .

7

ii) By integration around a unit circle, evaluate  $\int_0^{2\pi} \frac{\cos 3\theta}{5 - 4\cos\theta} d\theta$ .

8

4. a) i) Verify that  $f(x, y) = \begin{cases} 1^{-(x+y)}, & x \geq 0, y \geq 0 \\ 0, & \text{otherwise} \end{cases}$  is a density function of a joint

probability distribution. Then evaluate :

1)  $p\left[\frac{1}{2} < x < 2, 0 < y < 4\right]$

2)  $p(x < 1)$

3)  $p(x > y)$

4)  $p(x + y \leq 1)$ .

10

ii) Using the method of least squares, fit a linear relation of the form  $p = a + bw$ , to the following data, where p is the pull required to lift a weight w.

w (kg-wt)      50    70    100    120

p (kg-wt)      12    15    21    25

Estimate p when w is 150 kg.

5

OR

b) i) The joint probability distribution is given by the following table

X \ Y	-3	2	4
1	0.1	0.2	0.2
3	0.3	0.1	0.1

Find cov (X, Y) and  $\rho(X, Y)$ .

7



ii) A binary communication channel carries data as one of 2 types of signals denoted by 0 and 1. Due to noise, a transmitted 0 is received as 1 with probability 0.06 and a transmitted 1 is received as 0 with probability 0.09. The probability of transmitting a 0 is 0.45. If a signal is sent determine :

- 1) The probability that a 1 is received.
- 2) The probability that a 0 was transmitted, given that a 0 was received.
- 3) The probability that 101 is received as 011.

8

5. a) Derive that D' Alemberts solution of wave equation  $\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$  with initial

conditions  $u(x,0) = f(x)$  and  $\frac{\partial u}{\partial t}(x,0) = 0$ .

15

OR

b) A bar 100 cm long, with insulated sides, has its ends kept at 0°C and 100°C until steady state conditions prevail. The 2 ends are then suddenly insulated and kept so. Find, the temperature distribution.

15

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M 19270

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**IV Semester B.Tech. (Reg./Sup./Imp. including Part Time) Degree  
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**PT2K6/2K6CE/ME402 : HUMANITIES**

Time : 3 Hours

Max. Marks : 100

I. Rewrite as directed in the brackets of **each** sentence.

- 1) a) Time makes worst enemies friends. (place articles,  
b) May we have pleasure of your company ? (place articles)  
c) Let us discuss matter seriously. (articles)  
d) Tiger, animal equal to lion in size, is native of Asia. (insert necessary articles) 2
- 2) a) A child is not able to distinguish good \_\_\_\_\_ evil. Death does not distinguish \_\_\_\_\_ the rich or the poor. (prepositions)  
b) His creditors became impatient \_\_\_\_\_ payment, and impatient \_\_\_\_\_ delay they banged at the door. (insert prepositions) 2
- 3) a) He jumped up. He ran away. (Begin with "Jumping....")  
b) He is very fat therefore, he cannot run. (Begin "He is too...") 2
- 4) Rama is more clever. Krishna is less clever. I think it. I judge by the results of the examination. (combine the sentences into one complex sentence) 2
- 5) are you angry my friends said the King because you have lost your leader  
I am your King I will be your leader (punctuate) 2
- 6) a) His dress was poor and mean. (Use the adverbials of )  
b) She examined the documents with care. (adverbial of) 2
- 7) When supper had been prepared Robinson sat down expecting himself to enjoy greatly. (Use the noun forms of 'prepared' and 'expecting') 2
- 8) a) The speaker said that it gave him great pleasure to be there that evening. (put it into direct speech)  
b) She wrote, "I am waiting and watching and longing for my son's return". (change into indirect speech) 2

P.T.O.



9) Rewrite the following sentences improving the arrangements.

a) A nurse maid is wanted for a baby about twenty years old.

b) Sometimes you will see an alligator lying in the sunshine on the bank eight feet long. 2

10) a) I saw you through the trick. (means-saw, detected, proved, helped)

b) The strain is telling upon his health. (means showing, affecting, effecting) 2

II. Answer **any seven** of the following questions.

(7×5=35)

1) What is communication ? What makes it technical ?

2) Do you agree with “good listening leads to good communication” ? Why ?

3) What are the types of communication studied ? Briefly explain each.

4) What are the components of written communication ?

5) What makes a technical presentation effective ?

6) What are the chiefly known communication barriers ?

7) How did the ancient people make use of science ?

8) What is ethics ? What are its aims ?

9) What necessitates engineering ethics to have a code ?

10) What are intellectual property ? How are they protected ?

III. Answer **any one** of the following :

(15×1)

a) Formal examination alone can determine a students' ability. How do you support this ?

b) How does tourism broaden our mindset ?

IV. What factors determine a technical communication as effective ?

(15×1)

OR

What are the responsibilities of an engineer ? What impedes them ?

V. Any scientific development affects society. Keeping your study of science, society and culture in mind evaluate this statement.

(15×1)

OR

Give an account of the technological and scientific growth in the field of communication.

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M 19275

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**IV Semester B.Tech. (Reg./Sup./Imp. Including Part Time) Degree  
Examination, June 2011  
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**PT2K6 /2K6ME 403 : THERMODYNAMICS**

Time: 3 Hours

Max. Marks: 100

*Instructions : Answer all questions.*

*Use of Thermodynamics Data Book and Charts permitted.*

**PART – A**

1. a) Explain the concept of thermodynamic equilibrium. How does it differ from thermal equilibrium ?
- b) Define the following : Latent heat, sensible heat, super heat and degree of super heat. Mention their units.
- c) Differentiate between 'heat' and 'work'. How are they different from internal energy ?
- d) Write general energy equation for a flow system and reduce it for steady flow system.
- e) Give 3 examples for reversible process and explain why you consider them as reversible.
- f) Write down Helmholtz and Gibbs functions and mention their importance.
- g) Explain Joule Thomson coefficient and its significance.
- h) Explain Gibbs-Dalton model for mixtures of gases. (8×5=40)

**PART – B**

2. a) Show the P-T diagram for water and mark all important points and regions. 5
- b) With the help of neat diagrams explain the construction and working of any three instruments used for temperature measurement. Mention their relative merits and demerits. 10

OR

P.T.O.



- c) A pressure vessel contains 1.75 kg of steam at 5 bar and 0.89 d.f. Calculate the quantity of heat to be rejected so that the steam at the end becomes 0.55 dry (at constant volume). 15
3. a) Explain the first law of thermodynamics applied to a cyclic process. 5
- b) In an air conditioned room of  $200\text{ m} \times 12\text{ m} \times 3\text{ m}$  size 100 persons are seated for a conference. Each person emits 400 kJ of heat per hour. The room is insulated adiabatically. If there is supply failure for 10 mins what will be the increase in temperature of the hall if the volume occupied by each person is  $0.07\text{ m}^3$ ? Assume the initial pressure and temperature of air at the time of supply failure are 1 bar and  $20^\circ\text{C}$ . 10

OR

- c) Write down the steady flow energy equation and explain each quantity shown in the equation. Reduce this equations for the following cases :
- i) Throttling process
  - ii) Flow through a nozzle
  - iii) Flow through a rotary compressor
  - iv) Shell and tube steam condenser. 15
4. a) Write the Clausius' and Kelvin-Planck's statements of the second law of thermodynamics and deduce that they are equivalent to each other. 10
- b) Write a note on increase of entropy principle. 5

OR

- c) Derive the expression for Clausius' inequality and explain its significance. Also prove that entropy is a thermodynamic property. 15
5. a) Derive the four Maxwell equations from fundamentals. Mention the use of these equations in thermodynamic applications. 15

OR

- b) A gaseous mixture has  $C_p = 1.968\text{ kJ/kg K}$  and its molecular weight is  $18.04\text{ kg/kmol}$ . 2 kg of this gas is contained in a constant volume vessel of  $0.3\text{ m}^3$  volume at  $5^\circ\text{C}$ . Heat is added to the gas till its temperature rises to  $100^\circ\text{C}$ . Find
- i) Work done ii) Heat transferred
  - iii) Change in internal energy iv) Change in entropy. 15
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M 19276

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**PT2K6/2K6ME404 : MANUFACTURING PROCESSES**

Time : 3 Hours

Max. Marks : 100

*Instruction : Answer all questions.*

**PART – A**

1. a) Explain each term in the tool signature given by 6-8-10-7-18-12-2 mm. Indicate them on the sketch.
- b) Explain with example standard marking system of grinding wheel.
- c) Briefly explain the principle of water jet machining.
- d) Classify modern machining processes on the basis of type of energy employed and state the mechanism of material removal.
- e) List the advantages and applications of casting.
- f) Explain spheroidizing.
- g) Differentiate between extrusion and pultrusion.
- h) Give the advantages of laminated glass. (8×5=40)

**PART – B**

2. a) Explain the following drilling machine operations :
  - i) Reaming
  - ii) Boring
  - iii) Counter boring
  - iv) Counter sinking. 6
- b) Write a note on selection of grinding wheel. 6

**P.T.O.**



c) Explain the terms grit, grade and structure with respect to a grinding wheel. 3

OR

d) Explain the crank and slotted link mechanism of a shaper. 6

e) Explain the following milling operations.

i) Slab milling    ii) Face milling    iii) Straddle milling

iv) Angle milling    v) T-slot milling    vi) Cam milling. 9

3. a) Explain Abrasive jet machining highlighting process parameters. 8

b) With suitable sketch explain electron beam machining. Give its applications. 7

OR

c) With sketch explain EDM machining set up. Discuss important process parameters. 9

d) Explain the principle of ECM. Give its advantages and applications. 6

4. a) With sketches explain extrusion process. 6

b) With neat sketch explain continuous casting. 6

c) Give the advantages of die casting. 3

OR

d) Briefly explain hydrostatic extrusion. 7

e) Explain various steps in lost wax process. 8

5. a) Briefly explain the processes for the production of discrete glass products. 9

b) Briefly explain hydroplating forming. 6

OR

c) Discuss various steps involved in making ceramic parts. 10

d) Describe the features of an extruder. 5

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M 19277

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**IV Semester B.Tech. (Regular/Sup./Improv. – including Part Time) Degree  
Examination, June 2011  
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**PT2K6/2K6 ME 405 : FLUID MACHINERY**

Time: 3 Hours

Max. Marks: 100

*Instructions : i) Answer all questions.*

*ii) Missing data if any may be suitably assumed.*

1. a) Explain the principle of jet propulsion for ships.  
b) Write a note on similitude and types of similarities.  
c) Write a note on governing of reaction turbines.  
d) Explain the functions and different types of draft tubes.  
e) Write a note on surging and priming in pumps.  
f) Explain various losses and efficiencies of a centrifugal pump.  
g) Sketch and explain the working of Vane pump.  
h) Sketch and explain the working of hydraulic press. (8×5=40)
  
2. a) Derive the expressions for force exerted and work done by an impinging jet on a curved plate which moves in the direction of jet. 15
  
- OR
- b) What do you mean by dimensional homogeneity ? Explain with suitable examples. 7
- c) Explain Buckingham's  $\pi$  theorem of dimensional analysis. What are its advantages over Rayleigh's method ? 8
  
3. a) With a neat sketch explain the working of Kaplan turbine. 9
- b) Define and derive the expressions for  
i) Reynolds number ii) Froude's number. 6

OR

P.T.O.



- c) A pelton turbine has a water supply rate of  $5 \text{ m}^3/\text{s}$  at a head of 256 m and runs at 500 rpm. Assuming overall efficiency of 85%, coefficient of velocity for nozzle as 0.985 and speed ratio of 0.46, calculate
- i) Power output
  - ii) Specific speed
  - iii) No. of jets
  - iv) Diameter of the wheel
  - v) Jet diameter
  - vi) No. of pelton cups
  - vii) Cup dimensions. 15
4. a) What do you mean by Vortex flow ? Explain free and forced vortex flow. 8
- b) Write a note on cavitation and separation in pumps. 7
- OR
- c) A centrifugal pump with 1.2 m diameter runs at 200 rpm and pumps 1880 lits/s. The average lift being 6 m, the angle which the vanes make at the exit with the tangent to the impeller is  $26^\circ$  and radial velocity of flow is 2.5 m/s. Determine manometric efficiency and the least speed to start pumping against a head of 6 m. The inner diameter of the impeller being 0.6 m. 15
5. a) Derive the expression for work done by reciprocating pump against friction with air vessels. Also prove that work saved against friction in a single acting reciprocating pump fitted with air vessel is 84.8%. 15
- OR
- b) Sketch and explain the working principle of
- i) Hydraulic crane
  - ii) Hydraulic coupling. 15
-



**M 19461**

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Examination, June 2011  
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**PT 2K6/2K6 ME 406 : MACHINE DRAWING**

Time : 3 Hours

Max. Marks : 100

- Instructions :** 1) *Answer all questions.*  
2) *Any missing data can be assumed.*  
3) *Neatness carries weightage.*

1. Draw the front view and top view of a hexagonal headed bolt with hexagonal headed nut and washer.

OR

2. Draw the following forms of foundation bolts : 20  
a) Split end type                      b) Rag end type.

3. Sketch a cotter joint for connecting rods of 40 mm. Indicate approximate proportions.

OR

4. Draw the half sectional elevation of a flanged coupling. 20

5. Details of a tail stock are shown in Fig. 1. Draw the half sectional elevation and plan with all parts assembled together.

OR

6. Details of a screw jack are shown in Fig. 2. Draw the left half sectional elevation and plan in the assembled position. 50

7. Explain how will you indicate surface roughness with the help of neat figures.

OR

8. Explain about the clean up commands used in auto CAD. 10

P.T.O.



ITEM	DESCRIPTION	QTY.
1.	BODY	1
2.	STUD	1
3.	SCREW	4
4.	HAND WHEEL	1
5.	BARREL	1
6.	FLANGE	1
7.	DEAD CENTRE	1
8.	SCREW SPINDLE	1

ITEM	DESCRIPTION	QTY.
9.	HANDLE -1	1
10.	KEY-1	1
11.	HANDLE-2	1
12.	WASHER-1	1
13.	NUT-1	1
14.	NUT-2	1
15.	WASHER-2	2
16.	KEY-2	1

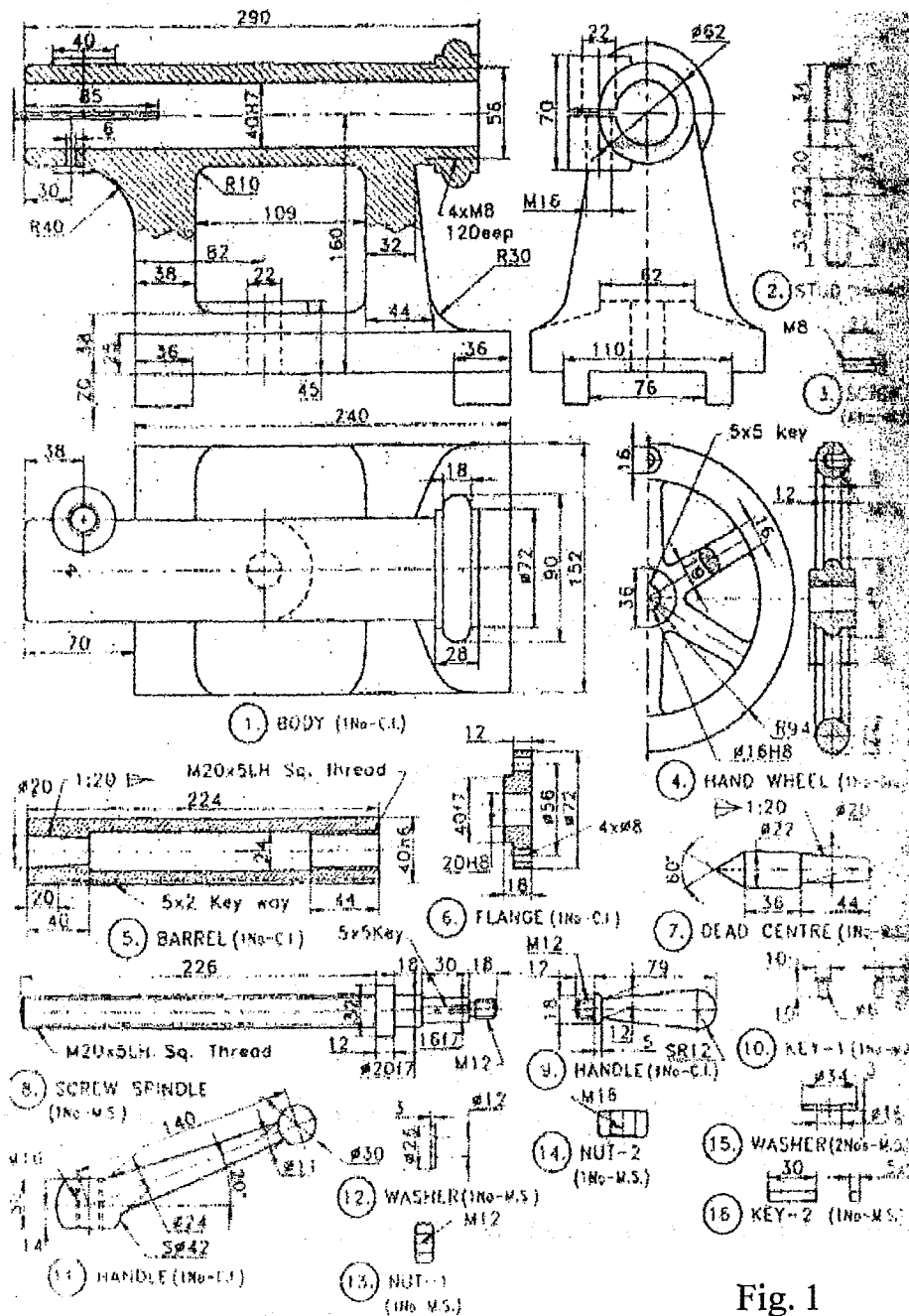


Fig. 1



ITEM	DESCRIPTION	QTY.
1.	CUP	1
2.	NUT	1
3.	BODY	1
4.	TOMMY BAR	1
5.	SCREW ROD	1
6.	WASHER	1
7.	SET SCREW	1

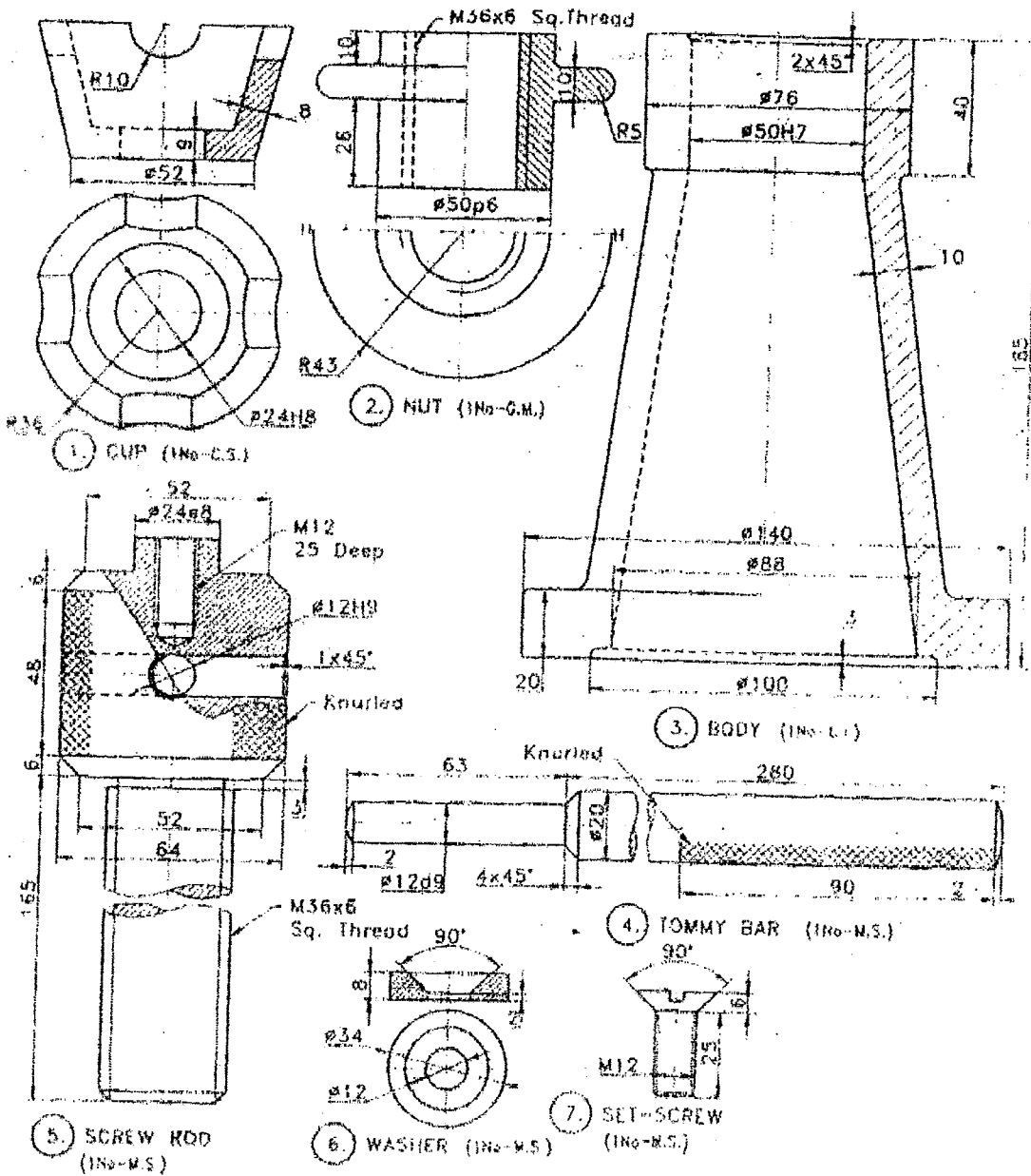


Fig. 2