



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER-I [ALL]
SUBJECT: MATHEMATICS-I

UB

Examination : Regular External Seat No. : _____
Date : 23/12/2013 Day : Monday
Time : 2:30 pm to 5:30 pm Max. Marks : 60

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

SECTION - I

Q.1

- (a) Prove that at the points in which the Archimedean spiral $r = a\theta$ intersect the hyperbolical spiral $a = r\theta$ their curvature are in the ratio 3:1 [12]
- (b) Find the surface area of solid generated by revolving the astriod $x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}}$ about the X axis.
- (c) Prove that $\int_0^m \left(m + \frac{1}{2}\right) 2^{2m-1} = \sqrt{2m} \sqrt{\pi}$ and hence find the value of $\int_0^1 \frac{1}{2}$
- (d) Evaluate in terms of elliptic integral $\int_0^{\infty} \frac{x}{\sqrt{(x^4 + 25)(x^4 + 100)}} dx$

Q.2

[09]

- (a) Prove that $\int_0^1 \frac{x^2}{\sqrt{1-x^4}} dx \cdot \int_0^1 \frac{1}{\sqrt{1-x^4}} dx = \frac{\pi}{4}$ in terms of gamma function.
- (b) Define error function and prove that $\int_0^{\infty} e^{-st} \operatorname{erf} \sqrt{t} dt = \frac{1}{s\sqrt{s+1}}$
- (c) Find the length of the curve $x = e^{\theta} \left(\sin \frac{\theta}{2} + 2 \cos \frac{\theta}{2} \right), y = e^{\theta} \left(\cos \frac{\theta}{2} - 2 \sin \frac{\theta}{2} \right)$ measured from $\theta = 0$ to $\theta = \pi$

OR

[09]

Q.2

- (a) Find the pedal equation of $r^m = a^m \cos m\theta + b^m \sin m\theta$ and hence find radius of curvature.
- (b) If $I_n = \frac{d^n}{dx^n} \{x^n \log x\}$ prove that $I_n = nI_{n-1} + (n-1)!$ and hence show that
$$I_n = n! \left(\log x + 1 + \frac{1}{2} + \frac{1}{3} + \dots + \frac{1}{n} \right)$$
- (c) Evaluate $\int_0^{\pi} \sin^2 \theta \frac{\sqrt{1-\cos \theta}}{1+\cos \theta} d\theta$

Q.3

[09]

- (a) Find the area common to the circles $r = a\sqrt{2}$ and $r = 2a \cos \theta$
- (b) Obtain the reduction formula for $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^n x dx$ and hence evaluate $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cot^6 x dx$
- (c) Find the perimeter of the curve $y = \log \left(\frac{e^x - 1}{e^x + 1} \right)$ from $x=1$ to $x=2$.

[PTD]

OR

- Q.3** (a) Calculate the area common between the curves $r = 3 \cos \theta$ and $r = 1 + \cos \theta$ [09]
 (b) Find the volume generated by revolving the area between the curves $9y = 4(9 - x^2)$ and $4x + 3y = 12$ about the X axis.
 (c) Find the perimeter of the curve $y = e^x$ from the point (0, 1) to (1, e).

SECTION-II

Q.4

- (a) If $y^{\frac{1}{m}} - y^{\frac{-1}{m}} = 2x$ then prove that [12]

$$y = 1 + mx + \frac{m^2 x^2}{2!} + \frac{m^2(m^2 - 1)x^3}{3!} + \frac{m^2(m^2 - 4)x^4}{4!} + \dots$$

 (b) Solve $(1 + e^{\frac{x}{y}})dx + e^{\frac{x}{y}}(1 - \frac{x}{y})dy = 0$
 (c) Find the orthogonal trajectory of $\frac{x^2}{a^2 + \lambda} + \frac{y^2}{b^2 + \lambda} = 1$, where λ is the parameter.
 (d) Expand the function $\frac{x}{2} \left(\frac{e^x + 1}{e^x - 1} \right)$ in powers of x up to three nonzero terms.

Q.5

- (a) Solve: $(5x^4 + 3x^2y^2 - 2xy^3)dx + (2yx^3 - 3x^2y^2 - 5y^4)dy = 0$.
 (b) Solve: $y' = \frac{y^3}{e^{2x} + y^2}$
 (c) Prove: $e^{a \sin^{-1} x} = 1 + ax + \frac{a^2 x^2}{2!} + \frac{a(a^2 + 1)x^3}{3!} + \dots$ and hence deduce that

$$e^{\theta} = 1 + \sin \theta + \frac{1 \sin^2 \theta}{2!} + \frac{2 \sin^3 \theta}{3!} + \frac{5 \sin^4 \theta}{4!} + \dots$$

OR

Q.5

- (a) Solve: $\left[y \left(1 + \frac{1}{x} \right) + \cos y \right] dx + (x + \log x - x \sin y) dy = 0$
 (b) Solve: $\frac{dr}{d\theta} + r \tan \theta = \sin 2\theta$.
 (c) Expand $x^3 + y^3 + xy - 1 = 0$ then prove that $y = 1 - \frac{x}{3} - \frac{26x^3}{81} \dots$

Q.6

- (a) Solve: $(xy^2 + 2x^2y^3)dx + (x^2y - 2x^3y^2)dy = 0$ [09]
 (b) Solve: $\frac{dy}{dx} + 4y = x^3$
 (c) A copper ball is heated to a temperature of 100°C at a time $t=0$. Then it is placed in water that is maintained at a temperature of 40°C . At the end of the 4 minute the temperature of ball is reduced to 60°C . Find the temperature of ball at the end of 6 minute also find the time at which the temperature of the ball is 50°C .

OR

Q.6

- (a) If $y = \frac{x^3}{(x-1)(x+1)}$ find $y_n(1)$. [09]
 (b) Solve: $(x\sqrt{1-x^2y^2} - y)dy + (y\sqrt{1-x^2y^2} + x)dx = 0$
 (c) Expand $y = \frac{\pi}{2} - \cos^{-1} x$ in powers of x .



DHARMSINHDESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER I [EC/CE/IC/CH/CL/IT/MH]
SUBJECT: (AF122) Basic Electrical & Electronics Engineering

Examination : External (Regular)
Date : 24/12/2013
Time : 2:30 pm to 5:30 pm

Seat No : _____
Day : Tuesday
Max. Marks : 60

INSTRUCTIONS:

1. Answer each section in separate answer book.
2. Figures to the right indicate maximum marks for that question.
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SECTION - I

Q.1 Do as directed. [10]

- (a) With the same secondary voltage and filter, which has the most ripples? [1]
A. Half-wave rectifier, B. Full-wave rectifier, C. Bridge rectifier, D. Impossible to say.
- (b) What is the PIV across each diode of a bridge rectifier with a secondary voltage of 20V rms? [1]
A. 14.1V, B. 20V, C. 28.3V, D. 34V
- (c) Why do conductors have positive temperature coefficient of resistance while semiconductors have negative temperature coefficient of resistance? [2]
- (d) Draw the energy band diagram for (I) Unbiased PN junction diode, (II) Forward biased PN junction diode. [2]
- (e) State true/false with reason, 'For a diode, DC resistance and bulk resistance are same' [2]
- (f) A Zener regulator has an input voltage ranging from 15 to 20 V and a load current ranging from 5 to 20 mA. If the zener voltage is 6.8 V, what is the maximum allowable series resistance? [2]

Q.2 Attempt *Any TWO* from the following questions. [10]

- (a) Determine the current delivered by the battery in the circuit of figure-1. [5]
- (b) For the circuit of figure-2, determine the current through and the voltage across each component using node voltage analysis. [5]
- (c) The resistance of the field coils of a dynamo is 173Ω at 16°C . After working for 6 hours on full load, the resistance of the coil increases to 212Ω . Calculate the mean temp rise of field coils. Assume temperature coefficient of resistance of copper to be $0.00426/^\circ\text{C}$. [5]

Q.3 (a) Assuming a barrier potential of 0.7V at an ambient temperature of 25°C , what is the barrier potential of a silicon diode when the junction temperature is at 100°C ? at 0°C ? [4]
(b) Design a stiff clipper that clips the voltage above 2V. (diode bulk resistance is 25Ω) [3]
(c) Calculate the load voltage, load current, and diode power in figure-3, using the third approximation. (diode bulk resistance is 23Ω) [3]

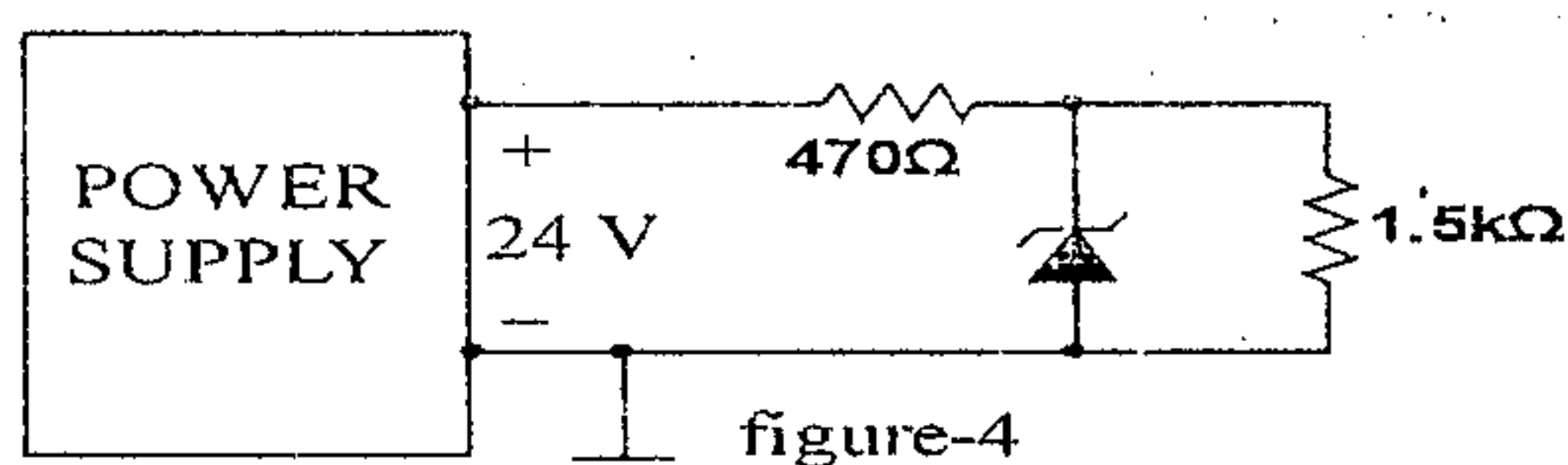
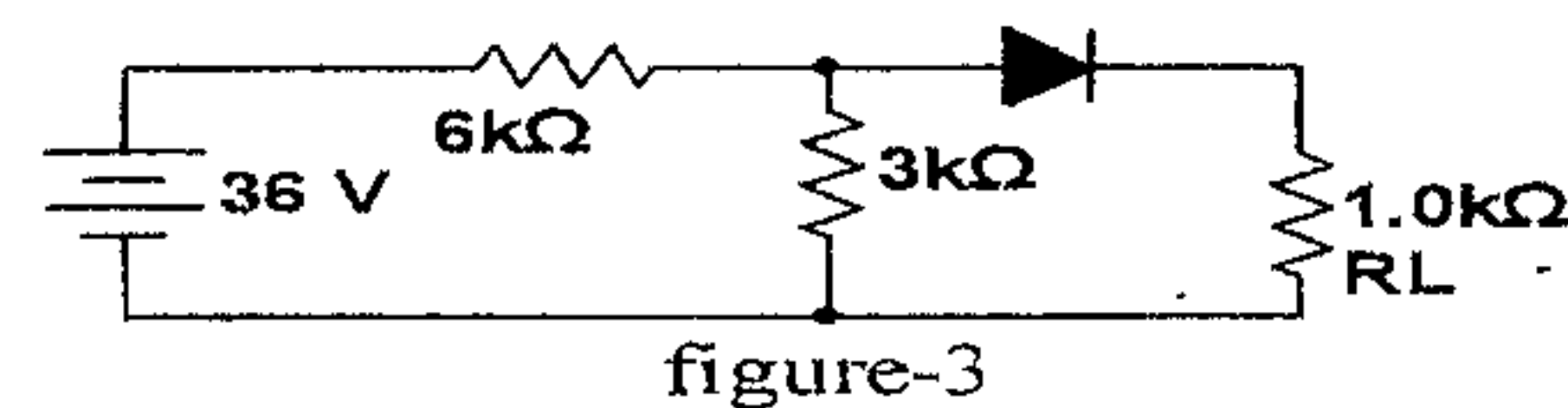
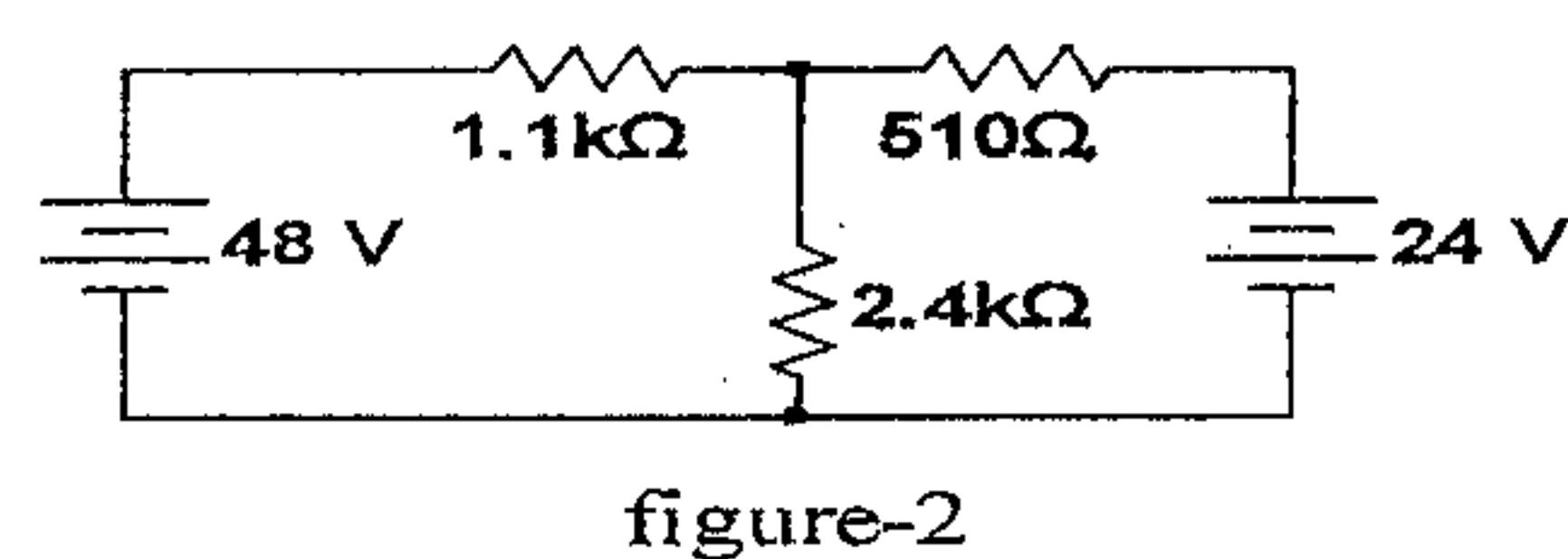
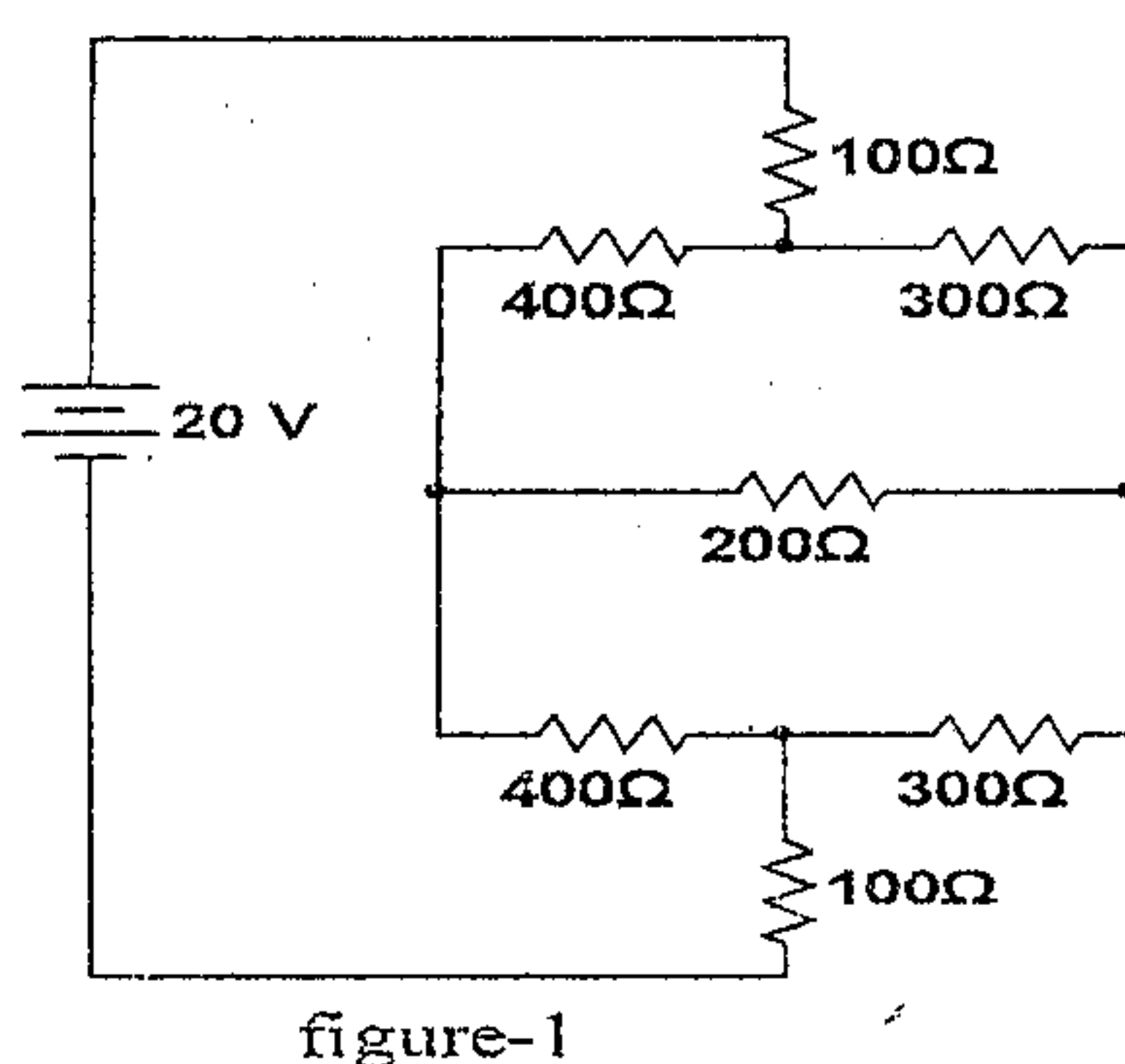
OR

Q.3 (a) Draw the circuit of full-wave rectifier (using two diode) followed by the capacitor-input filter. If transformer turns ratio is 5:1, Capacitor is $100\mu\text{F}$, load resistor is $5\text{k}\Omega$, the ripple frequency is 120Hz, the ripple voltage is 0.417 V pp. Find out the rms value and frequency of input line voltage. [5]
(b) (I) The zener diode of figure-4 has a zener resistance of 14Ω and zener voltage 15V. If the power supply has a ripple of 1 V pp, what is the ripple across the load resistor? (II) During the day, the ac line voltage changes. This causes the unregulated 24 V output of the power supply to vary from 21.5 to 25 V. What is the voltage change over the foregoing range? [5]

[P T O]

SECTION - II

- Q.4** Do as directed. [10]
- Define (i) Magnetizing force (ii) Magnetic leakage [1]
 - State true or false only: We can additionally use Fleming's right hand rule for understanding working of D.C. motor. [1]
 - By varying magnetic field and putting conductor steady within it we can produce _____ induced emf in conductor. [1]
 - State true or false with justification: In step up transformer frequency will increase from primary to secondary winding. [1]
 - If $A = 1 + j7$; $B = 3 + j3$; $C = -7 - j9$; $D = 5 - j12$ then find [2]
 - $A + B$ and $C + D$ & (ii) $A \times B$ and $C \times D$ and show results in polar form.
 - Derive an expression for ampere-turns required for a simple and composite magnetic circuit. [2]
 - A straight conductor 25 cm long carries 100 A and lies perpendicular to as uniform field of 0.5 wb/m^2 Find: (i) the mechanical force acting on the conductor (ii) the power necessary to derive the conductor against the force at an uniform speed of 1.27 m/sec. (iii) the emf generated in conductor (iv) the electrical power developed. [2]
- Q.5** Attempt *Any TWO* from the following questions. [10]
- (i) Derive equations for voltage, current, impedance and p.f. of RC series circuit. Also draw phasor diagram. [3]
 - (ii) An iron ring 15 cm in diameter and 10 cm^2 in cross sectional area is wound with 200 turns of wire. For a flux Density of 1 Wb/m^2 , and a permeability 500, find the exciting current. [2]
 - Derive the expression for resonance frequency, Q factor and bandwidth of a series resonance circuit. And also draw the resonance curve. [5]
 - Find the rms value of resultant current in a wire which carries simultaneously a direct current of 10 A and a sinusoidal alternating current with peak value of 10 A. [5]
- Q.6**
- Define Terms: (i) Phase (ii) Phase difference (iii) Positive Phase sequence (iv) Periodic wave form (v) form factor [5]
 - Two coils, with a coefficient of coupling of 0.5 between them, are connected in series so as to magnetize: (a) in the same direction, (b) in the opposite direction. The corresponding values of total inductance are for (a) 1.94, and (b) 0.7 H. find the self-inductances of the two coils, and the mutual inductance between them [5]
- OR**
- Q.6**
- Explain theory and working principle of induction motor with necessary diagram. [5]
 - Two coils A and B lie in parallel planes. Coil A has 15000 turns and coil B has 12000 turns. 55 % of flux produced by coil A links coil B. Current of 6A in coil A produces 0.05 mwb, while the same current in coil B produces 0.08 mwb. Calculate the mutual inductance and coupling coefficient. [5]





Examination : External (Regular)
Date : 26/12/2013
Time : 2:30 pm to 5:30 pm

Seat No : _____
Day : Thursday
Max. Marks : 60

INSTRUCTIONS:

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5. Draw neat sketches wherever necessary.
6. File names having .dat extension, are sample file names to be used with command. No need to show contents here.

SECTION - I

Q.1 Do as directed.

[10]

- (a) Give solution to achieve this:
 - (I) One process want to feed data to another process.
 - (II) The output of command, user neither wants to display on screen nor to store in file and still let the command complete task.
- (b) State TRUE or FALSE. Justify with reason or example:
 - (I) Execution of shell script spawns another process.
 - (II) Soft links are copies of original file/directory and occupies double the space.
- (c) What is alias? How is it useful?
- (d) Explain absolute and relative file permissions with example.
- (e) What is "vi" utility? Give example of usage of different modes of "vi"?

Q.2 Attempt Any TWO from the following questions.

[10]

- (a) Explain the UNIX Architecture with diagram. List different features of UNIX.
- (b) Using regular expression based utilities and editors, achieve following tasks:
 - (I) Validate a file phone_numbers.dat and display only those lines, which are valid phone numbers. 10 digit formatted like 123-456-7890, (123) 456-7890, 123 456 7890 are valid.
 - (II) Perform in place changes, remove lines numbered 1,10,100,1000 from file records.dat
 - (III) Consider result123.dat file contains marks data in "id name exam1 exam2 exam3" format. Display and store data in result321.dat in format "id name exam3 exam2 exam1".
- (c) Using Linux command line utilities, work on files **Technologies1.txt** and **Technologies2.txt**. Explain in brief your logic to achieve following different tasks:
 - (I) List technologies unique to file Technologies2.txt. Show the first difference between these files.
 - (II) Merge these files into output file Technologies.dat with no duplicate entry.
 - (III) Help user with steps to convert Technologies1.txt into Technologies2.txt

<u>Technologies1.txt</u>	<u>Technologies2.txt</u>
Apache is a web server.	Apache is a web server.
Drupal is content management system.	Drupal is content management system.
Solr is search engine based source.	Hadoop is framework for distributed processing.
XShell is multitab shell client.	Solr is search engine based source.
Yum is Linux package installer.	XShell is multitab shell client.

- Q.3** (a) Explain how to manipulate the positional parameters using "set" and "shift" commands. How can we judge whether there are any input by positional parameter or not? [5]
- (b) Develop a shell script for following requirement: [5]
Using if-elif-else construct, provide functionality when user opts for any of the following choice. Exit application with success or failure notification based on choice:
 - (1) Display user's home directory, current shell type, default pager.
 - (2) Find and delete all hard links of file temp.dat within \$HOME directory and subdirectories.
 - (3) Find and replace all spam words (available in spams.dat) with word "SPAM" in data.dat.

OR

- Q.3** (a) Using test and [], discuss how to evaluate expressions of different types of inputs: number, string, file. [5]
- (b) Develop a shell script for following requirement: [5]
Using case construct, provide functionality when user opts for any of the following choice. Exit application with success or failure notification based on choice:
 - (1) Display concatenated file contents of file1.dat, file2.dat, file3.dat with increasing line numbers.
 - (2) Display snapshot of the current processes on the screen and also store to a file named

status_MMDDYYYY.dat. Here, placeholder MMDDYYYY is for appropriate system's date value.

- (3) Attendance.dat file contains data in following format. Perform text processing and generate comma separated value (csv) file named attendance.csv where each column data is separated by comma.

Th1/Th1OO Th2/Th2OO Th3/Th3OO Pr1/Pr1OO Pr2/Pr2OO Pr3/Pr3OO Overall/OOO
4/4 11/11 11/12 4/4 6/6 6/8 42/45

SECTION - II

Q.4 Do as directed.

[10]

- Fill in the blank with conceptual words to give meaning to statement.
 - Every file is associated with a table/data structure, called _____ and it is accessed by _____.
 - Linux commands _____ and _____ need sorted input to complete their functionality.
- What will be output/effect of following, clearly specify your understanding:
 - `x=101; echo -e "\0$x";`
 - `ls bar; ls -d bar;`
- Explain shell's interpretive cycle. How can we instruct shell to change behavior?
- Discuss how Linux maintains history of user's work. What is the purpose of man command?
- List directory related commands and give example of usage. (Any four)

Q.5 Attempt *Any TWO* from the following questions.

[10]

- What is file? List and discuss different categories of files. Discuss the UNIX File system with diagram.
- Exercise Linux commands to achieve following different tasks. Refer diagram **fig.tree**.

<ol style="list-style-type: none"> Create respective files and directories being user james. Change current directory from "sources" to "java". (Use relative paths) Create hard links to each .c, .sh and .java file into sources folder. (Use absolute paths) File helloworld.sh from sh directory, create soft link into executables folder. Do the needful to be able to execute helloworld.sh without specifying its actual location. 	<pre> graph TD home --> james james --> c james --> sh james --> java james --> programs c --> helloworldc[helloworld.c] sh --> helloworldsh[helloworld.sh] java --> helloworldjava[helloworld.java] programs --> executables programs --> sources </pre>
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- Using different filters and other Linux features work on **people.txt**. Explain in brief your logic to achieve following different tasks:

<ol style="list-style-type: none"> Sort the file content based on age of person and then by name. Display how many persons are there of age 50 years. Display list of age groups. Display youngest and oldest person detail. 	<p>people.txt</p> <p>Dave 24 John 12 Nish 50 Timothy 15 Doll 16 Ram 12 Sam 16</p>
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- Discuss user management in Linux: Types of users, profiles, user related commands, authentication and privileges. [5]
- Develop a shell script to generate following series. Successive terms are term multiplied by its position, starting 1 on 1st position, given alternating signs afterwards. Read the number of terms from user. Please, note that arithmetical signs are not considered as term in the count. [5]

1 - 1 + 2 - 6 + 24 - 120 + ...

OR

- What is a command? Discuss Linux command structure. What shall user do to automatically execute set of commands as per scheduled day/time? [5]
- Develop a shell script to display following pattern triangle. Read number of lines from user. [5]

```

1
3 3
5 5 5
7 7 7 7
9 9 9 9 9
          
```

...

Also, at the end of the triangle display summation of all generated terms of triangle.

Examination : External (Regular)

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SECTION - I**Q.1 Do as directed.****[10]**

- (a) Give solution to achieve this:
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- (a) Explain the UNIX Architecture with diagram. List different features of UNIX.
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Technologies1.txt

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Drupal is content management system.
Solr is search engine based source.
XShell is multitab shell client.
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Technologies2.txt

Apache is a web server.
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Hadoop is framework for distributed processing.
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Q.3 (a) Explain how to manipulate the positional parameters using "set" and "shift" commands. How can we judge whether there are any input by positional parameter or not? [5]**(b) Develop a shell script for following requirement: [5]**

Using if-elif-else construct, provide functionality when user opts for any of the following choice. Exit application with success or failure notification based on choice:

- (1) Display user's home directory, current shell type, default pager.
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OR**Q.3 (a) Using test and [], discuss how to evaluate expressions of different types of inputs: number, string, file. [5]****(b) Develop a shell script for following requirement: [5]**

Using case construct, provide functionality when user opts for any of the following choice. Exit application with success or failure notification based on choice:

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SECTION - II

Q.4 Do as directed.

[10]

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- Explain shell's interpretive cycle. How can we instruct shell to change behavior?
- Discuss how Linux maintains history of user's work. What is the purpose of man command?
- List directory related commands and give example of usage. (Any four)

Q.5 Attempt *Any TWO* from the following questions.

[10]

- What is file? List and discuss different categories of files. Discuss the UNIX File system with diagram.
- Exercise Linux commands to achieve following different tasks. Refer diagram **fig.tree**.

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- Using different filters and other Linux features work on **people.txt**. Explain in brief your logic to achieve following different tasks:

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OR

- What is a command? Discuss Linux command structure. What shall user do to automatically execute set of commands as per scheduled day/time? [5]
- Develop a shell script to display following pattern triangle. Read number of lines from user. [5]

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 3 3
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 7 7 7 7
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 ...

Also, at the end of the triangle display summation of all generated terms of triangle.



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER I [EC/IC/CH/CL]
SUBJECT: (AX123) PROGRAMMING IN C

Examination : External Regular
Date : 26/12/13
Time : 2:30 to 5:30

Seat No : _____
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SECTION – I

Q.1 Do as directed.

- (a) State whether the following variables names are Valid or Invalid? If Invalid, Why? [02]
1. Price\$
 2. group one
 3. float_add
 4. Avg_N
- (b) Determine the value of each of the following logical expressions if $int\ a = 5, b = 10, c = -6$ [02]
1. $a > b \ \&\& \ a < c$
 2. $a == c \ || \ b > a$
- (c) Assuming that $int\ x = 2, y = 1, z = 0$ initially, what will be their values after executing the following c statements? [02]
- ```
switch(x){
 case 2:
 x = 1;
 y = x + 1;
 default:
 x = 0; }
```
- (d) How many times the following loop will be executed? [02]
- ```
int count = 6;  
while(---count > 0) {  
    printf("%d",count); }
```
- (e) Explain Sentinel-controlled loop in brief with an example. [02]

Q.2 Attempt Any TWO from the following questions.

- (a) Explain the C Tokens in details. [10]
- (b) Write a program that will read the values of x (int) evaluate the following function [05]
- $y = x*x$, if $x > 0$ or $y = x$, if $x < 0$; using
1. if ...else statement
 2. conditional operator
- (c) List out the set of operators. Explain the Conditional and Bitwise operators in details. [05]

Q.3 (a) An electric power distribution company charges its domestic consumers as follows: [05]

Consumption Units	Rate of Charge
0-200	Rs. 0.50 per Unit
201-400	Rs. 100 + Rs. 0.65 per Unit excess of 200
401-600	Rs. 230 + Rs. 0.80 per Unit excess of 400
601 and above	Rs. 390 + Rs. 1.00 per Unit excess of 600

Write a program to that reads the power consumed (units) by a customer and prints the amount to be paid by the customer.

- (b) Write a program to display the list of all the odd numbers in between 1 to 1000. [05]

OR

Q.3 (a) Write the program to print out all Armstrong numbers between 1 to 500. [05]

(Hint: $153 = [(1*1*1) + (5*5*5) + (3*3*3)]$)

- (b) Write a Program to print the appropriate message depending on time which will be entered by the user using *else....if ladder*. [05]

00 - 12	"Good Morning"
12 - 18	"Good Afternoon"
18 - 21	"Good Evening"
21 - 24	"Good Night"
Else	"Invalid"

SECTION – II

Q.4 Do as directed.

- (a) State whether the following statements are true or false. [02]
1. The life of static variable is till the control remains within the block in which it is defined.
 2. If a global variable is defined, then the extern keyword is necessary in its declaration.
- (b) Distinguish: Global and Local variable [02]

- (c) What will be the output of the following program? [02]
- ```
#include<stdio.h>
void main(){
 int a=0;
 int b=5;
 {
 int a=100;
 int b;
 b=(a*a)+a+(a/10);
 printf("Value of b is %d\n",b); }
 b=a;
 printf("Value of b is %d\n",b);}
```
- (d) Explain the general format of *strlen( )* with an example. [02]
- (e) Give at least two reasons for why do we write separate functions? Why do we not squeeze the entire logic into one function *main( )*? [02]

**Q.5** Attempt *Any TWO* from the following questions. [10]

- (a) #include<stdio.h> [05]
- ```
int funtask(int);
void main( ){
    int p,ans;
    ans=funtask(p);
    printf("Ans is %d\n",ans);}
int funtask(int number) {
    int x,n=0;
    while(number)
    {
        x=number % 10;
        if(x%2)
        { n=n+1; }
        number/=10; }
    return(n);}
```

What will be the values of *ans* when the following statements are executed?

1. *funtask(135);*
 2. *funtask(2467);*
- (b) Write a program to check whether the two entered strings are equal or not and display appropriate message. [05]
- (c) What is the importance of *strncmp()* and *strncat()*? Explain with suitable example. [05]
- Q.6** (a) Write a recursive function that will compute the factorial of an entered number. [05]
- (b) Write a program that will prints just the initial of any name. [05]
- (Hint: Dharmsinh Desai University = DDU)

OR

- Q.6** (a) Write a program that will find the sum of the diagonal elements of a matrix *int[3][3]*. [05]
- (b) Write a recursive function that will generate and print the first n Fibonacci numbers. [05]



DHARMSINH DESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
B.TECH. SEMESTER I [EC/IC/CH/CL]
SUBJECT: (AX123) PROGRAMMING IN C

Examination : External Regular
Date : 26/12/13
Time : 2:30 to 5:30

Seat No : _____
Day : Thursday
Max. Marks : 60

INSTRUCTIONS:

1. Answer each section in separate answer book.
2. Figures to the right indicate maximum marks for that question.
3. The symbols used carry their usual meanings.
4. Assume suitable data, if required & mention them clearly.
5. Draw neat sketches wherever necessary.

SECTION – I

Q.1 Do as directed.

- (a) State whether the following variables names are Valid or Invalid? If Invalid, Why? [02]
1. Price\$
 2. group one
 3. float_add
 4. Avg_N
- (b) Determine the value of each of the following logical expressions if $int\ a = 5, b = 10, c = -6$ [02]
1. $a > b \ \&\& \ a < c$
 2. $a == c \ || \ b > a$
- (c) Assuming that $int\ x = 2, y = 1, z = 0$ initially, what will be their values after executing the following c statements? [02]
- ```
switch(x){
 case 2:
 x = 1;
 y = x + 1;
 default:
 x = 0; }
```
- (d) How many times the following loop will be executed? [02]
- ```
int count = 6;  
while(---count > 0) {  
    printf("%d",count); }
```
- (e) Explain Sentinel-controlled loop in brief with an example. [02]

Q.2 Attempt Any TWO from the following questions.

- (a) Explain the C Tokens in details. [10]
- (b) Write a program that will read the values of x (int) evaluate the following function [05]
- $y = x*x$, if $x > 0$ or $y = x$, if $x < 0$; using
1. ifelse statement
 2. conditional operator
- (c) List out the set of operators. Explain the Conditional and Bitwise operators in details. [05]

Q.3 (a) An electric power distribution company charges its domestic consumers as follows: [05]

Consumption Units	Rate of Charge
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601 and above	Rs. 390 + Rs. 1.00 per Unit excess of 600

Write a program to that reads the power consumed (units) by a customer and prints the amount to be paid by the customer.

- (b) Write a program to display the list of all the odd numbers in between 1 to 1000. [05]

OR

Q.3 (a) Write the program to print out all Armstrong numbers between 1 to 500. [05]

(Hint: $153 = [(1*1*1) + (5*5*5) + (3*3*3)]$)

- (b) Write a Program to print the appropriate message depending on time which will be entered by the user using *else...if ladder*. [05]

00 - 12	"Good Morning"
12 - 18	"Good Afternoon"
18 - 21	"Good Evening"
21 - 24	"Good Night"
Else	"Invalid"

SECTION – II

Q.4 Do as directed.

- (a) State whether the following statements are true or false. [02]
1. The life of static variable is till the control remains within the block in which it is defined.
 2. If a global variable is defined, then the extern keyword is necessary in its declaration.
- (b) Distinguish: Global and Local variable [02]

(c) What will be the output of the following program?

[02]

```
#include<stdio.h>
void main( ){
    int a=0;
    int b=5;
    {
        int a=100;
        int b;
        b=(a*a)+a+(a/10);
        printf("Value of b is %d\n",b);
    }
    b=a;
    printf("Value of b is %d\n",b);}
```

(d) Explain the general format of *strlen()* with an example.

[02]

(e) Give at least two reasons for why do we write separate functions? Why do we not squeeze the entire logic into one function *main()*?

[02]

Q.5 Attempt *Any TWO* from the following questions.

[10]

(a) #include<stdio.h>

[05]

```
int funtask(int);
void main( ){
    int p,ans;
    ans=funtask(p);
    printf("Ans is %d\n",ans);}
int funtask(int number) {
    int x,n=0;
    while(number)
    {
        x=number % 10;
        if(x%2)
        { n=n+1; }
        number/=10; }
    return(n);}
```

What will be the values of *ans* when the following statements are executed?

1. *funtask(135);*

2. *funtask(2467);*

(b) Write a program to check whether the two entered strings are equal or not and display appropriate message.

[05]

(c) What is the importance of *strncmp()* and *strncat()*? Explain with suitable example.

[05]

Q.6 (a) Write a recursive function that will compute the factorial of an entered number.

[05]

(b) Write a program that will prints just the initial of any name.

[05]

(Hint: Dharmsinh Desai University = DDU)

OR

Q.6 (a) Write a program that will find the sum of the diagonal elements of a matrix *int[3][3]*.

[05]

(b) Write a recursive function that will generate and print the first n Fibonacci numbers.

[05]



Max. Marks : 60

Seat No.:

INSTRUCTIONS: 1. Figures to the right indicates maximum marks for that question. 2. Answer each section in *separate drawing sheet*. 3. Retain all construction lines. 4. Assume suitable scale whenever necessary & mention it clearly. 5. Planning, accuracy & neatness of drawing carries weightage.

SECTION - I

Q.1 Figure 1 shows the pictorial view of an object. Draw its (i) Full Sectional front view as per sectional plane A-A, (ii) Top View and (iii) right hand side view. Dimension the views as per aligned system. **[10]**

Q.2 Attempt **ANY TWO** of the followings.

(a) Draw an ellipse passing through 60° corner Q of 30°-60° set square having smallest side PQ vertical and 45mm long. The foci of the ellipse coincides with the corners P & R of the set square. Use "arcs of circles" method. Find its eccentricity and also draw normal and tangent at point Q.

(b) The aperture (opening) MN of a horizontal parabolic reflector is 12 cm and is 10 cm to the right of vertical directrix D-D. Draw the shape of the reflector.

(c) A point M is 50mm from OA and at certain distance from OB. The lines OA & OB are inclined at 120 degree to each other. Draw the locus of the point M in the same plane if the product of its distances from OA & OB is always constant and equal to 2750mm². Name the curve drawn. Interpolate another location of M if it is (a) At a distance of 35mm from OA and (b) 30mm from OB

Q.3 (a) A motor cyclist drives his motor cycle on an arch bridge of 2metres radius. The diameter of the motor cycle wheel is 80cm. Draw the locus of contact point on the circumference of the wheel for one revolution on bridge. Use a suitable scale. Draw normal and tangent to the curve. [5]

(b) An inelastic string ST is already wound totally on the shape given as shown in figure with one end S fixed at S. Draw the locus of other end T of the string when it is unwound completely in clockwise direction. Name the path of end T of the string and draw normal and tangent at any point.

OR

Q.3 (a) A circular disc rolling 180° in anti-clockwise direction on a straight path covers 110mm during which point P which is on the circumference of the disc touches the straight path. Draw the locus of point P during this first 180° rotation of the disc. Add the remaining curve due to another 180° rotation of the disc on the same path. Draw normal and tangent to the curve drawn by at any point on it. [5]

(b) Draw a triangle ABC with AB=30mm, AC=40mm and $\angle BAC=45^\circ$. B & C are the points on an Archimedean spiral of one convolution of which A is the pole. Find the initial line and draw the spiral. Also draw normal and tangent to that curve. [5]

SECTION - II

Q.4 Fig3 shows 2 views of an object. Draw its isometric drawing showing all dimensions as per aligned system. [9]

Q.5(a) A straight line AB has its end A in third quadrant 60 mm & 30 mm from H.P. & V.P. respectively while its end B is in first quadrant, 25 from H.P. Draw its projections if the line AB is making 30° with H.P. while its top view makes 45° with V.P. Draw its projections and Find (1) its true length & (2) inclinations with V.P. [6]

(b) Draw the projections of a circle of 50mm diameter resting on the H.P. on a point A on the circumference. Its plane is inclined at 45° to H.P. and the diameter AB is making 30° with V.P. [9]

OR

Q.5 (a) Two lemons on a tree planted near compound wall of a bungalow are 1m and 1.25m above ground and 0.5m and 0.75m from a negligible thickness compound wall but on the opposite sides of it. The distance between lemons measured along the ground and parallel to the wall is 1.0m. Determine the real distance between the centers of two lemons. [6]

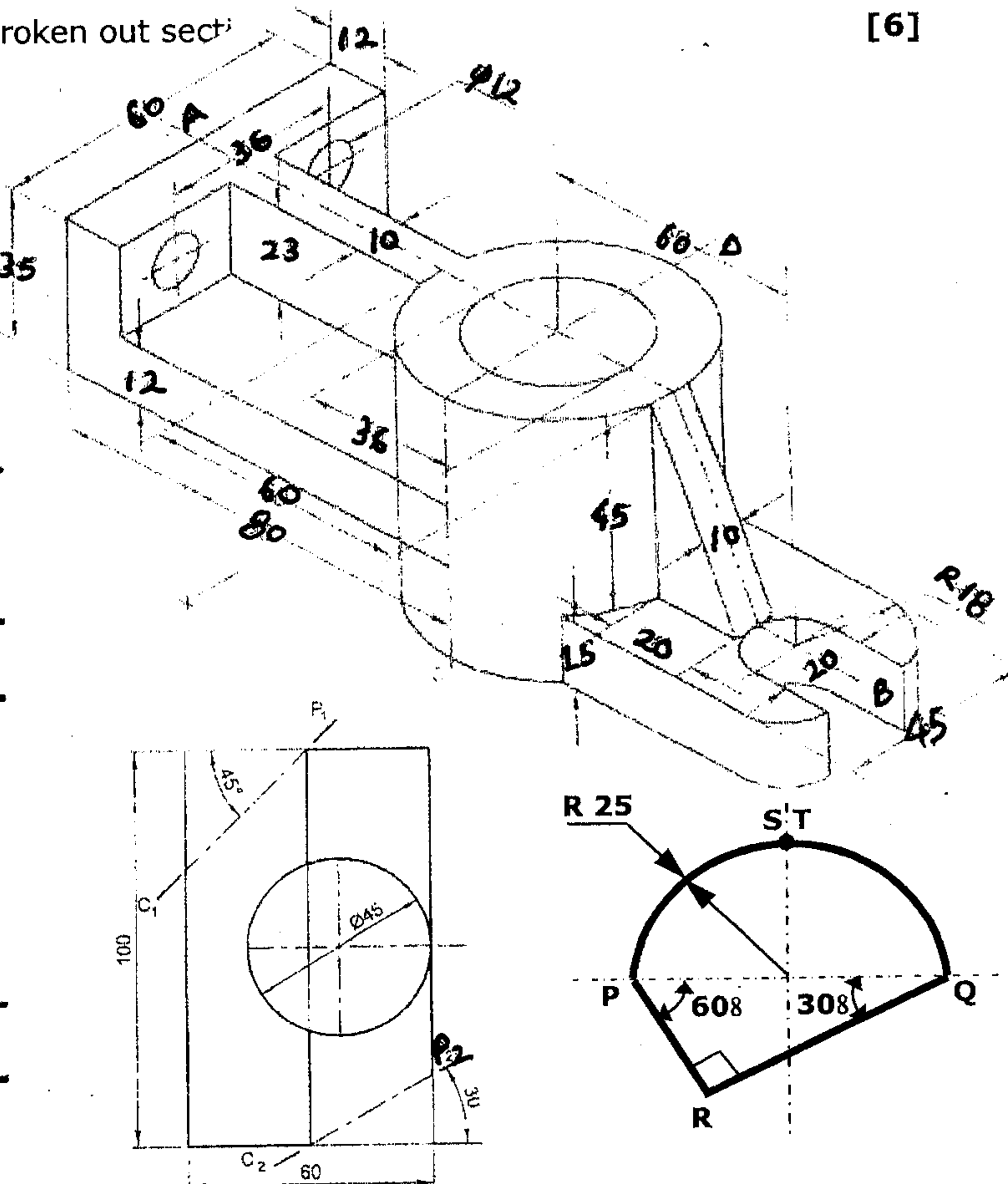
(b) A square pyramid of side of base 30mm and axis 55mm long is resting with its apex on the ground such that this point of contact of the apex on the ground is at a distance of 50 mm from the V.P. The inclined edge connecting the apex to one of the corners of the base is vertical and that triangle bounded by that vertical edge is perpendicular to V.P. Draw the front view and top view of the pyramid. [9]

Q.6 Fig 4 shows FV of a cylinder having length of axis = 100mm. Draw the development of surface A of cone.

OR

0.6 Draw neat proportionate sketches of following.

(i) Revolved (ii) removed section (ii) partial/local/broken out section





DHARMSINHDESAI UNIVERSITY, NADIAD
FACULTY OF TECHNOLOGY
SUBJECT: (AF114) ENGINEERING MECHANICS
B.TECH-Semester – I Branch -All

Examination : External
Date : 28/12/2013
Time : 2:30 PM To 5:30 PM

Seat No. :
Day : Saturday
Max. Marks : 60

LT 13

INSTRUCTIONS:

1. Figures to the right indicate maximum marks for that question.
2. The symbols used carry their usual meanings.
3. Assume suitable data, if required & mention them clearly.
4. Draw neat sketches wherever necessary.

SECTION - I

Q.1 Do as directed. [10]

- (a) Explain the Concept of Rigid Body. [2]
- (b) Define couple and equilibrant force. [2]
- (c) State and explain Varignon's principle of moment with suitable example. [2]
- (d) State the Pappus- Guldinus theorems I and II. [2]
- (e) Explain the term (1) Angle of Repose and (2) Angle of Friction [2]

Q.2 Attempt Any TWO of the following questions. [10]

- (a) Calculate magnitude and direction of resultant force of 2 D force system shown in figure 1, using analytical method. [5]
- (b) Calculate & locate the position of resultant force from point A, for the 2 D force system shown in figure 2. [5]
- (c) Find reactions R_A , R_B , R_C , and R_D if the weight of each sphere is 1.5kN. The system is in equilibrium. Refer Figure 3. [5]

Q.3 (a) Calculate reactions at supports for the beam shown in figure 4, using equilibrium conditions. [5]

- (b) The forces $P_1=100\text{N}$, $P_2=150\text{N}$, $P_3=180\text{N}$ are acting as shown in figure 5. The side of a cube is 1m. Calculate the resultant of the forces and its inclination with reference axes. [5]

OR

Q.3 (a) Find the centroid of the volume, if a plane area shown in Figure 6, rotates by one complete revolution about the Y axis. [5]

- (b) Calculate reactions at supports for the beam shown in figure 7, using Principle of Virtual Work. [5]

SECTION - II

Q.4 Do as directed. [10]

- (a) Differentiate terms 'kinematics and kinetics'. [2]
- (b) State D'Alembert's principle and Newton's second law of motion. [2]
- (c) Explain the Instantaneous center in the plane motion with suitable example. [2]
- (d) Define the term (1) Undamped forced vibration and (2) Radius of gyration. [2]
- (e) Explain the law of conservation of momentum with suitable example. [2]

Q.5 Attempt Any TWO of the following questions. [10]

- (a) Explain mass moment of inertia in rotational motion. Calculate mass moment of inertia of uniform cross section rod of mass m /unit length having length 'L' about its mid length point and at one of its end. [5]
- (b) The brakes are applied to a car of mass 2000 kg traveling at 72kmph, so as to cause all the wheels to skid. Calculate the time required to stop the car and frictional force. Take Coefficient of friction = 0.33 Use impulse momentum principle. [5]
- (c) Calculate velocity and its direction for indirect impact shown in figure 8. [5]

Q.6 (a) A bullet of mass 100 gm moving with a velocity of 300 m/s is fired into a log of wood and penetrates to a depth of 10cm. The same bullet moving with same velocity is fired into a similar piece of wood 4cm thick. Calculate its velocity, when it emerges out from the wood. Assume constant resistance in wood. [5]

- (b) Calculate acceleration of the system shown in figure 9. Neglect self-weight of pulley and friction. The rope is inextensible. Use Newton's laws. [5]

OR

- Q.6 (a) A spring deforms by 15mm when the pulling force is 900N. Calculate period of complete oscillation and acceleration of the mass, when a mass of 40kg is attached to the spring and it is pulled down by 22mm. [5]
- (b) Calculate acceleration of the system shown in figure 9. Neglect self-weight of pulley and friction. The rope is inextensible. Use D'Alembert's Principle. [5]

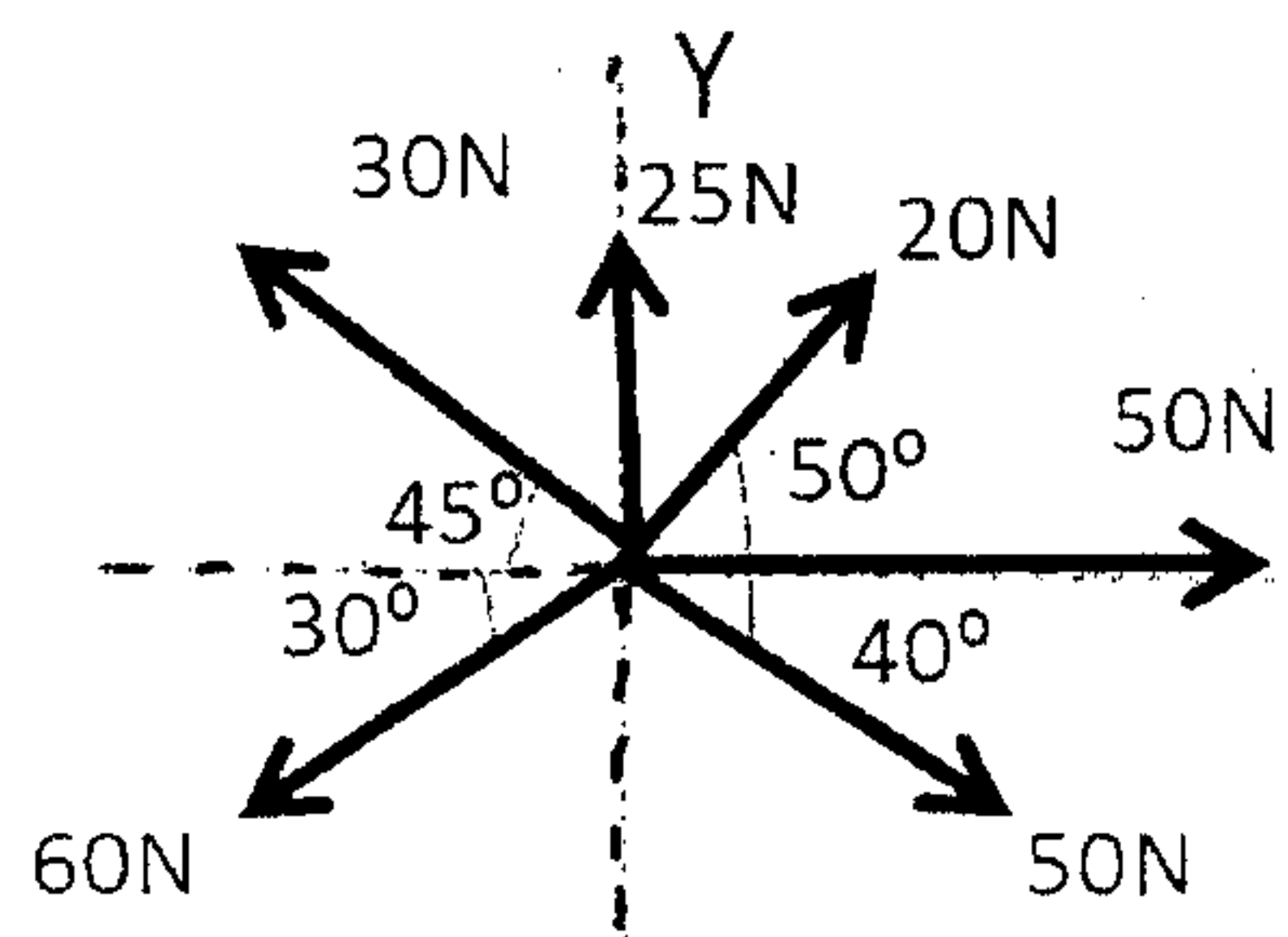


Figure 1

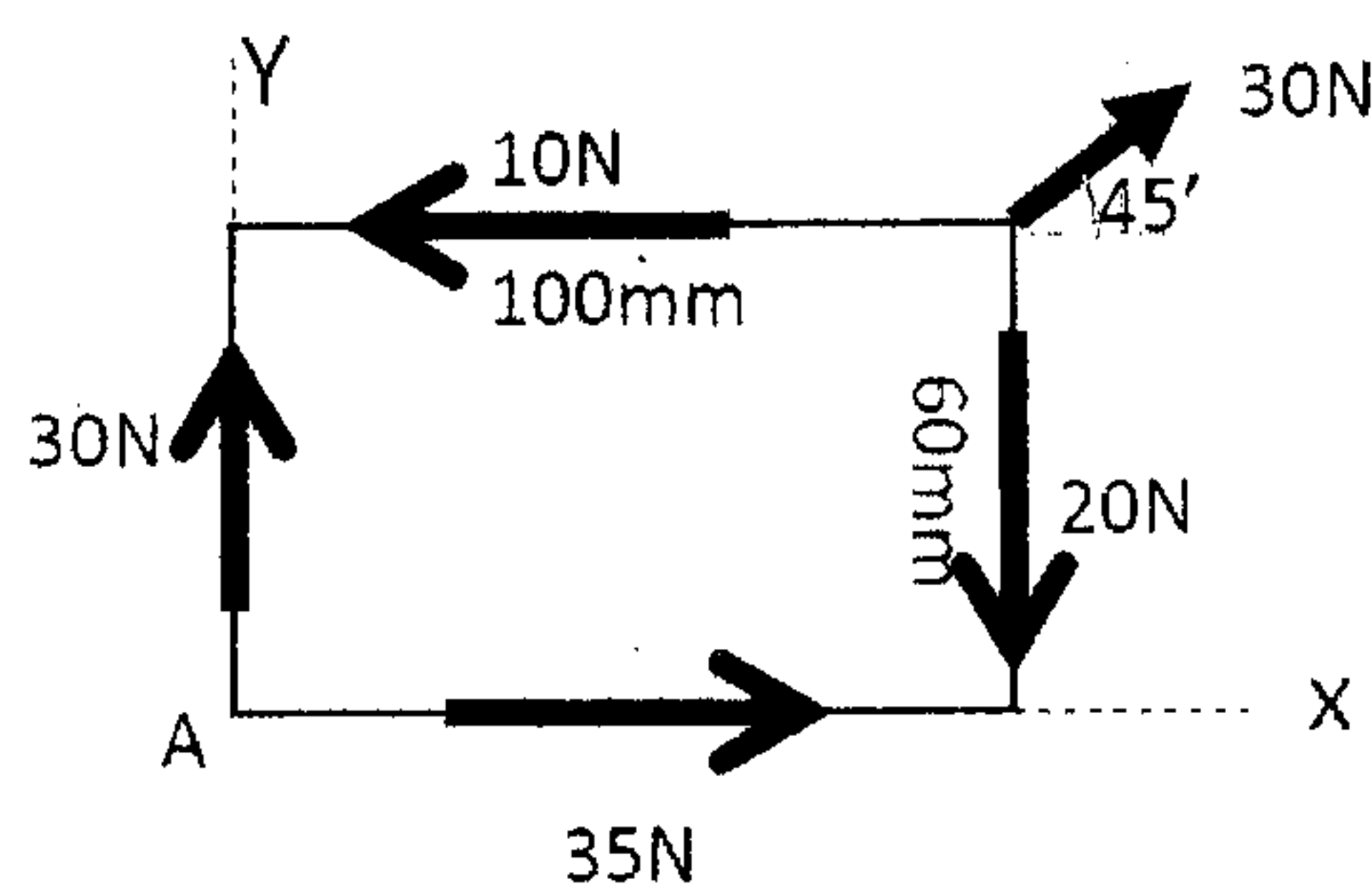


Figure 2

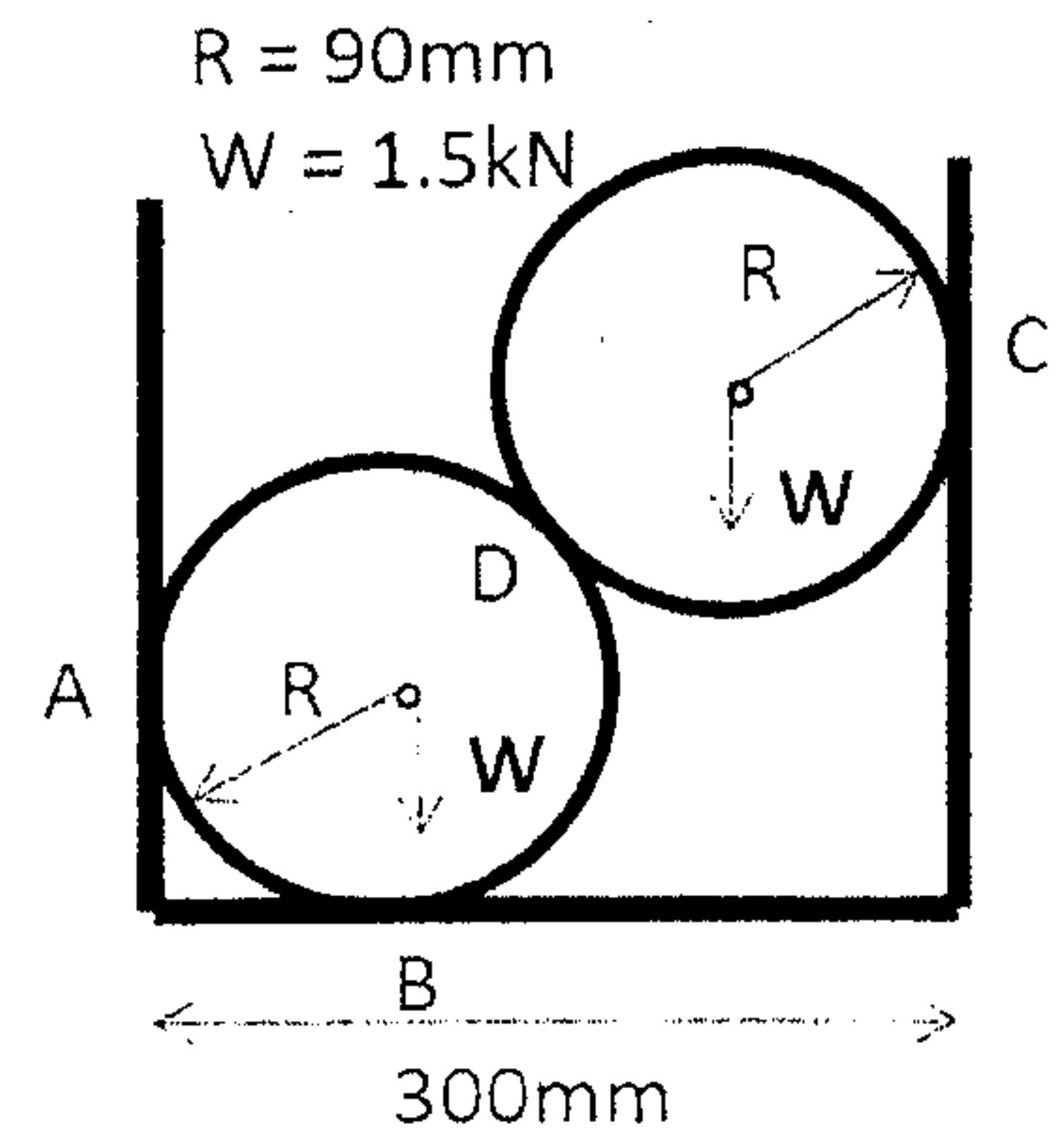


Figure 3

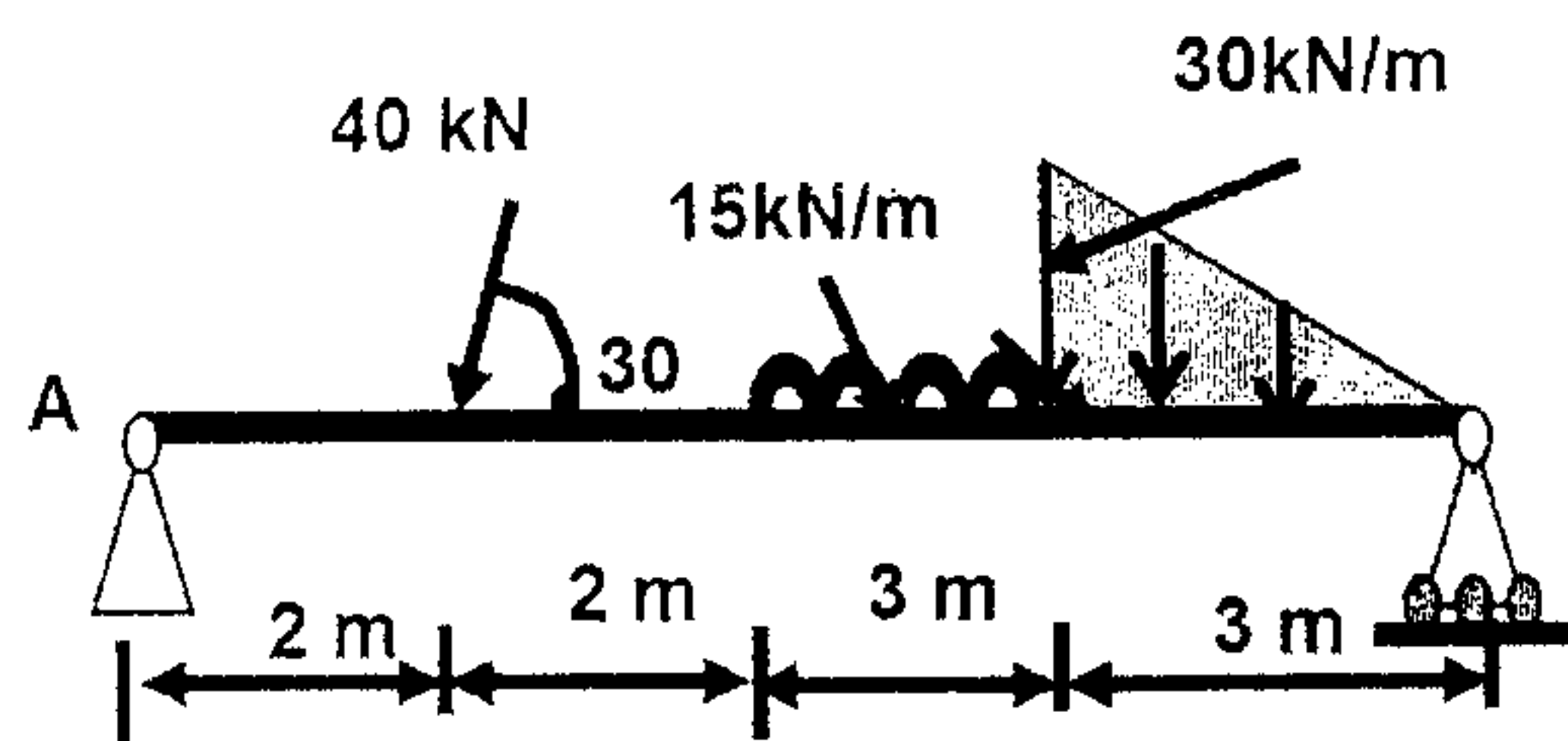


Figure 4

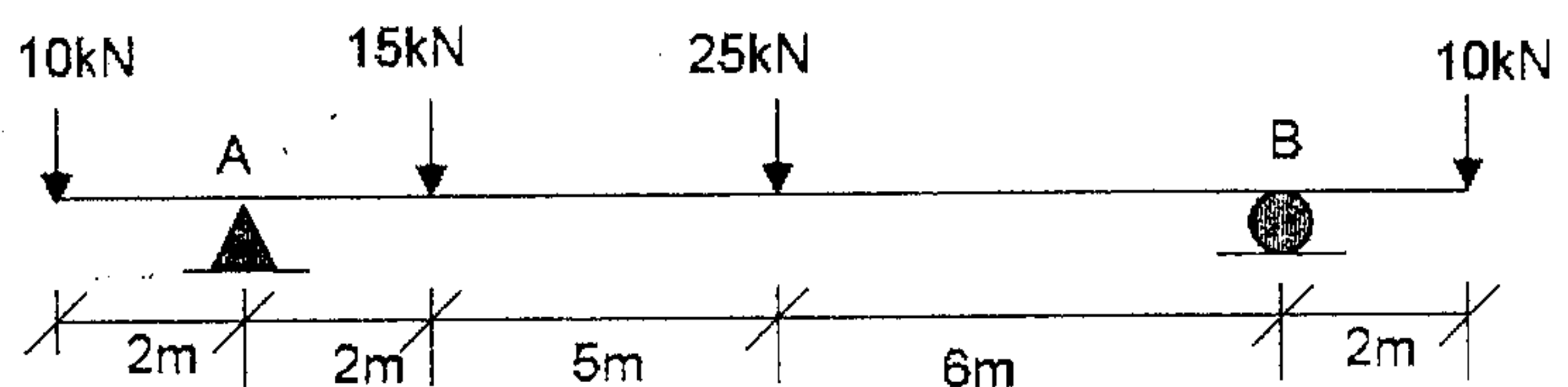


Figure 7

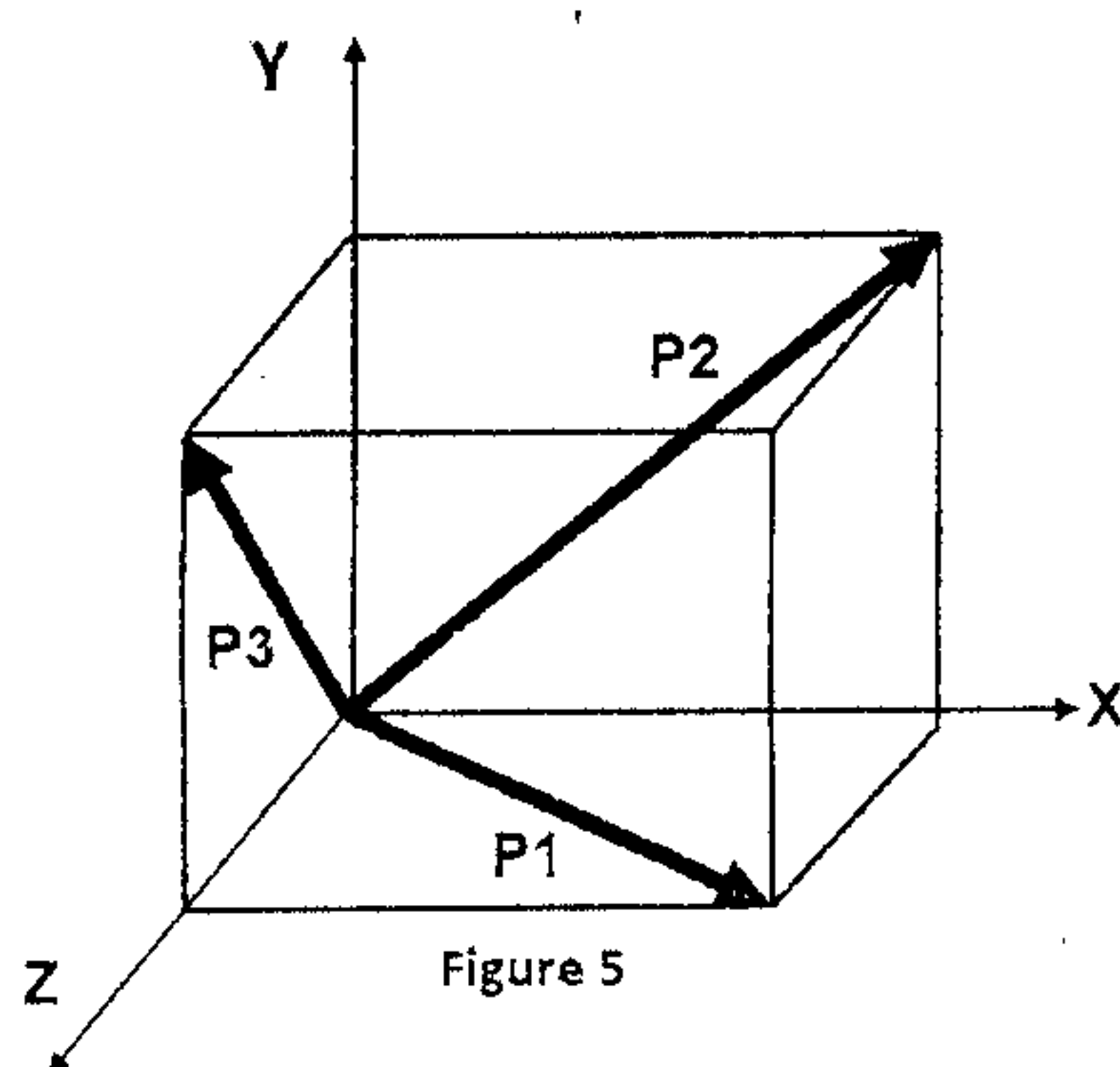


Figure 5

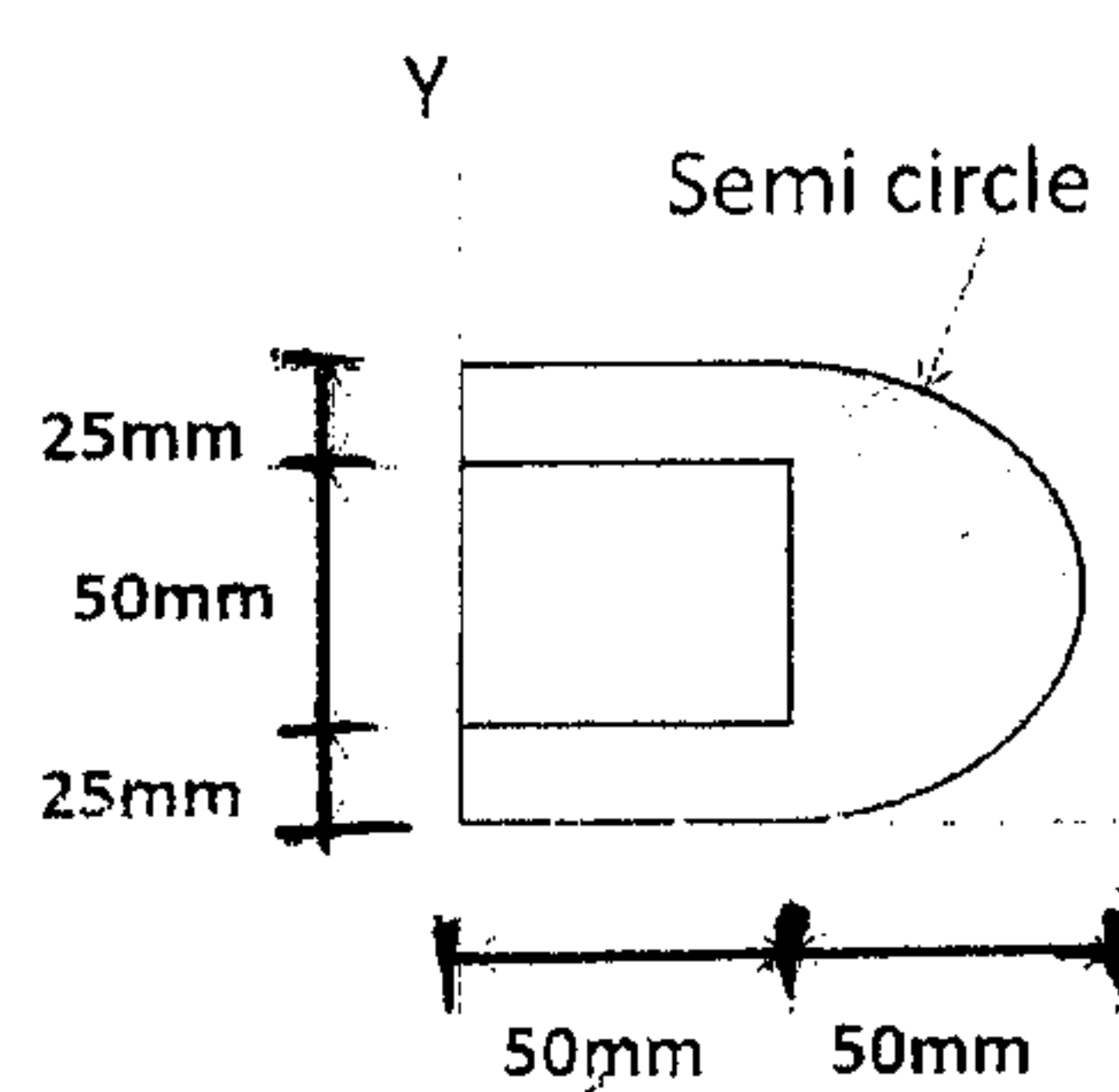


Figure 6

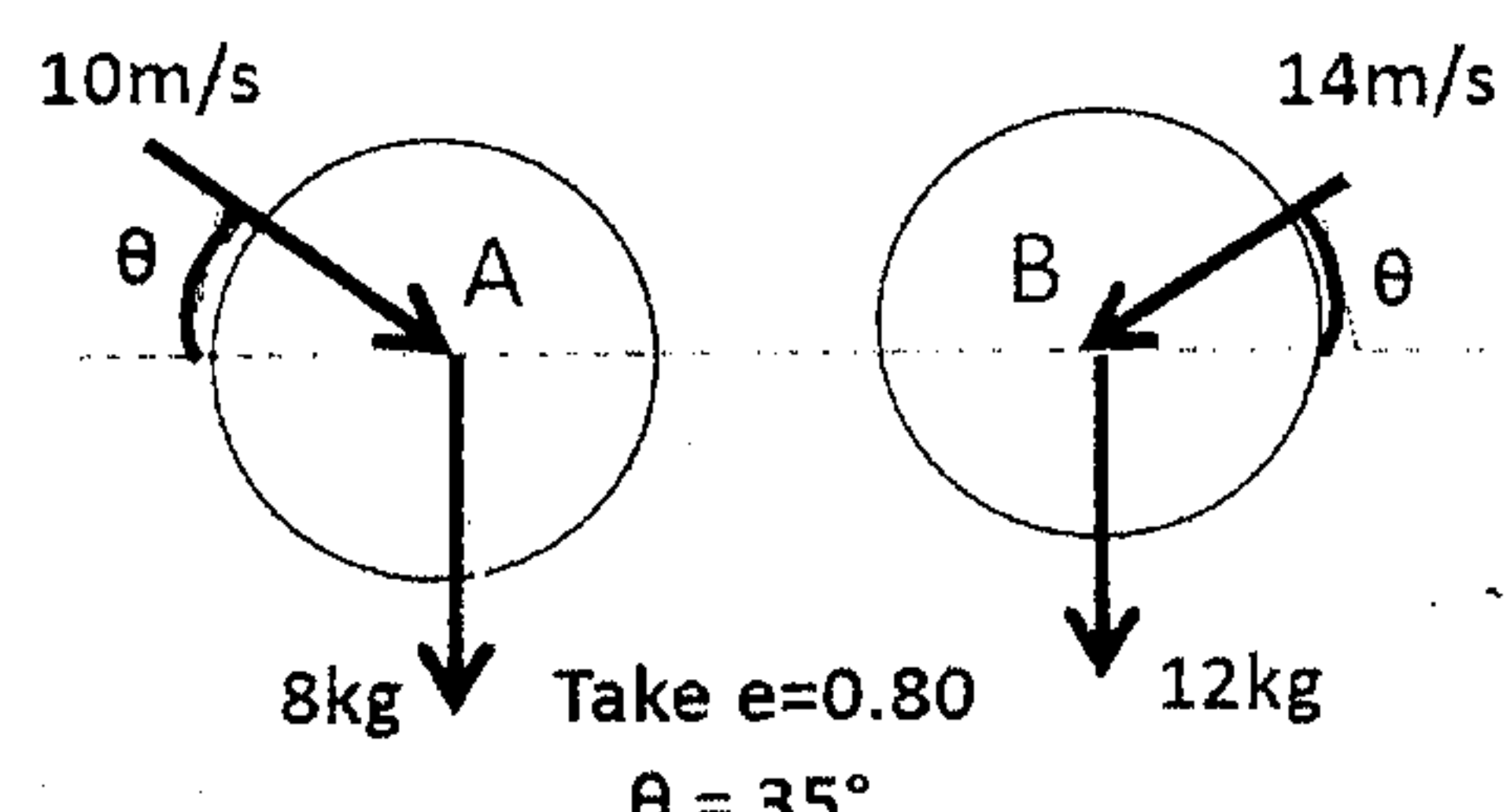


Figure 8

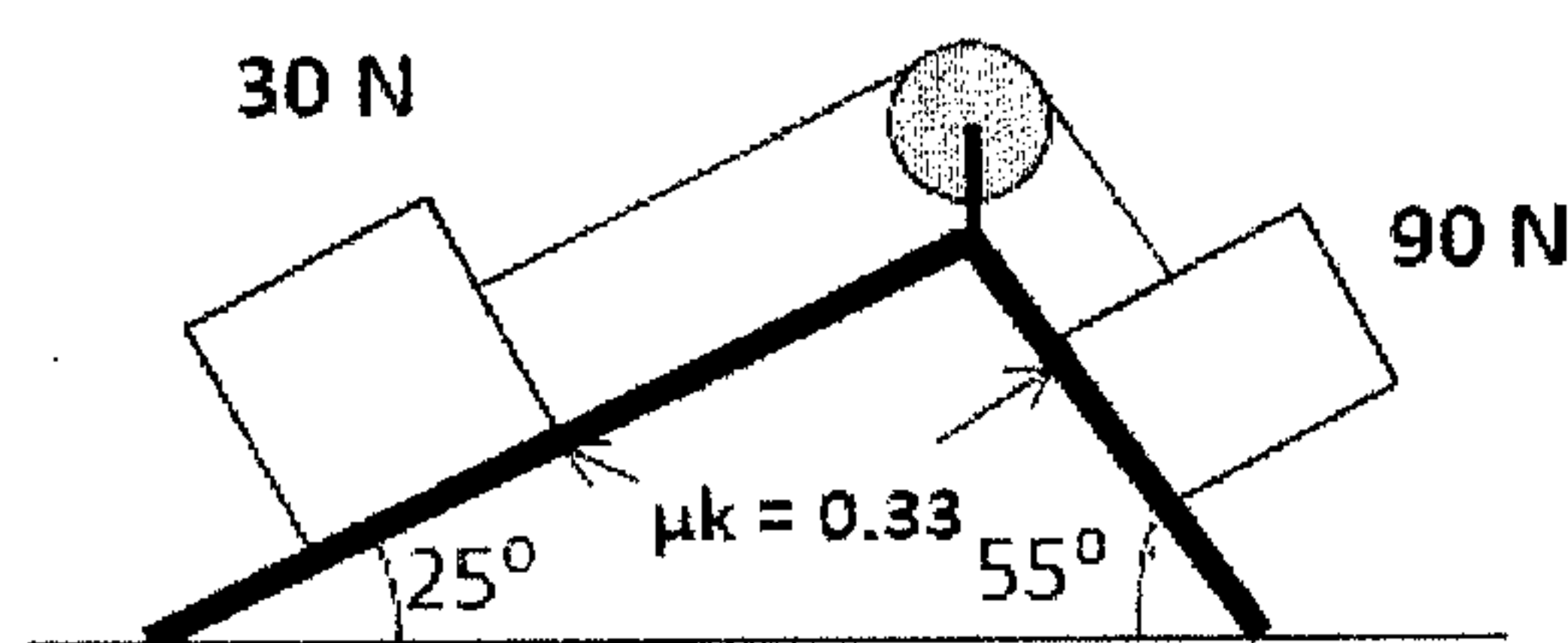


Figure 9