

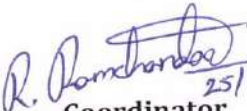
DEPARTMENT OF CIVIL ENGINEERING


ACADEMIC YEAR 2022-23 (ODD)

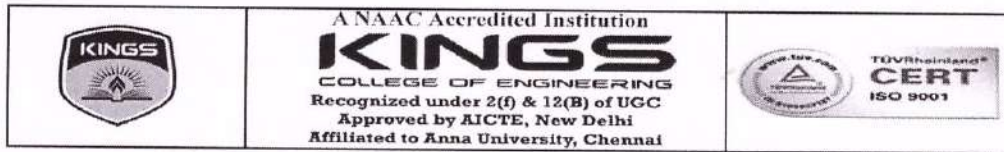
Date: 25.07.2022

CIRCULAR

This is to inform, that our department is going to conduct a **BRIDGE COURSE II (ENGINEERING MECHANICS)** on this academic year 2022-2023, Second year students are requested to enroll their name to Mr.Ramchandrar AP/CIVIL on or before **04.08.2022**.


25/7/22
Coordinator
(Mr.Ramchandrar AP/CIVIL)


25/07/22
HOD/CIVIL
(DR.R.SARAVANAN)



DEPARTMENT OF CIVIL ENGINEERING

BRIDGE COURSE II

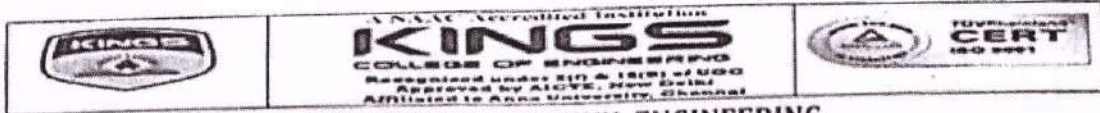
ENGINEERING MECHANICS

YEAR/SEMESTER: II/III

ACADEMIC YEAR: 2022-2023(ODD SEM)

PREPARED BY

MS.D.SHARMILA / AP /CIVIL



DEPARTMENT OF CIVIL ENGINEERING
SPECIAL TIME TABLE (11.8.2022 - 20.8.2022, ODD SEM)
B.E - CIVIL (Regulation 2017) - With Effect from 11.8.2022

Batch: 2021 - 2025

Strength: 19

Year: II

Semester: III

Class Room : 234

Block: II

Session	1	2	10.45 am - 11.00 am	3	4	12.30 pm - 01.10 pm	5	6	02.40 pm - 02.50 pm	7	8
Date	09.15am - 10.00am	10.00am - 10.45am		11.00am - 11.45am	11.45am - 12.30pm		01.10pm - 01.55pm	01.55pm - 02.40pm		02.50pm - 03.35pm	03.35pm - 04.20pm
11.8.22	ORIENTATION		BREAK	CC		LUNCH BREAK	RFC		BREAK	SDC	
12.8.22	RFC			CC			BC(I)			SDC	
16.8.22	BC(II)			RFC			CC			SDC	
17.8.22	BC(II)			RFC			BC(I)			CC	
18.8.22	BC(I)			CC			BC(II)			SDC	
20.8.22	SDC			RFC			BC(II)			BC(I)	

SUB CODE	NAME OF THE SUBJECT	CREDITS	NAME OF THE STAFF	DEPT	PERIODS/WEEK
VALUE ADDITION INITIATIVES (VAI)					
Orientation	Orientation Program	-	Mr.R.Ramchandrar	CIVIL	2
BC(I)	Bridge Course I (SOM)	-	Mr.R.Ramchandrar	CIVIL	8
BC(II)	Bridge Course II (EM)	-	Ms.D.Sharmila	CIVIL	8
RFC	Refresher Course	-	Ms.S.Gayathri	CIVIL	10
CC	Certification Course - AutoCADD	-	Mr.R.Chandrasekar	CIVIL	10
SDC	Skill Development Course (MS OFFICE)	-	Mr.R.Sundharam	CIVIL	10

CLASS CO-ORDINATOR	NAME OF THE REPRESENTATIVES	ROLL NO
Mr.R.Ramchandrar	S.Mohan	09
	G.V.Naaviniyaa	10

VALUE ADDITION INITIATIVES (VAI) - REGULAR HOURS				
CC	Certification Course - AutoCADD	VAI	Mr.R.Chandrasekar	CIVIL
LIB/NET	Library / Internet	VAI	Mr.R.Ramchandrar	CIVIL
NPTEL	NPTEL Swayam Courses	VAI	Mr.R.Ramchandrar	CIVIL
T&P (A)	Training & Placement - Aptitude	VAI	Dr.K.Sudhakar	T&P
T&P(SS)	Training & Placement - Softskill	VAI	Mr.B.Suresh Babu	T&P

D. Shrip
 DEPT. TTC 10/8/22

R. Santharam
 HOD 10/08/2022

J. Mani
 10/8/2022
 PRINCIPAL

ENGINEERING MECHANICS**COURSE OBJECTIVE**

- ❖ To Learn the use scalar and vector analytical techniques for analyzing forces in Statically determinate structures.
- ❖ To learn the principles of friction, forces and to apply the concepts of various engineering systems.
- ❖ To develop basic dynamics concepts – force, momentum, work and energy.

UNIT I FUNDAMENTAL CONCEPTS OF UNITS

6

Fundamental Concepts and Principles - Systems of Units - Method of Problem Solutions - Resultant of Forces - Unit Vectors- Newton's First Law of Motion .

UNIT II EQUILIBRIUM OF RIGID BODIES

6

Principle of Transmissibility - Equivalent Forces - Vector Product of Two Vectors -Varignon's Theorem - Scalar Product of Two Vectors.

UNIT III DISTRIBUTED FORCES

6

Centroids of lines and areas – symmetrical and unsymmetrical shapes- Moment of Inertia – Radius of Gyration of an Area - Parallel-Axis Theorem - Moments of Inertia of Composite Areas.

UNIT IV FRICTION

6

The Laws of Dry Friction- Coefficients of Friction - Angles of Friction- Wedge friction- Wheel Friction- Rolling Resistance -Ladder friction.

UNIT V DYNAMICS OF PARTICLES

6

Kinematics - Newton's Second Law of Motion - Work of a Force - Principle of Work and Energy- Principle of Impulse and Momentum- Impact of bodies.

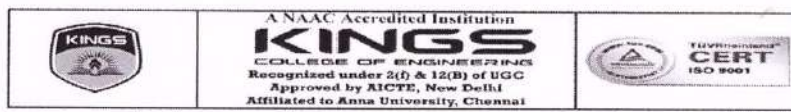
TOTAL PERIODS: 30**COURSE OUTCOME**

At the end of the course the students would be able to

- Illustrate the vectorial and scalar representation of forces and moments
- Analyse the rigid body in equilibrium
- Evaluate the properties of distributed forces


STAFF INCHARGE
 (Ms.D.SHARMILA)


HOD/CIVIL
 (Dr.R.SARAVANAN)




ACADEMIC YEAR 2022-23 (ODD SEM)
 BC-ENGINEERING MECHANICS
 ASSESSMENT MARKS

II YEAR CIVIL / V SEM

S.No.	Reg. Number	Student Name	Total marks(50)
1	821121103001	AKALYA J	50
2	821121103002	ANITHA B	50
3	821121103003	ARULPANDIYAN A	50
4	821121103004	ARUNKUMAR M	50
5	821121103005	HALITH A M	40
6	821121103006	MADHAN D S	45
7	821121103007	MANIKKARAJ R	40
8	821121103008	MATHANKUMAR S	40
9	821121103009	MOHAN S	50
10	821121103010	NAAVINIYAA G V	50
11	821121103011	NITHISH KUMAR T S	45
12	821121103012	PASHAGAN G (VOC)	45
13	821121103013	PRAGADISH M	40
14	821121103014	PRASANNA R	40
15	821121103015	SARAVANAN K	40
16	821121103016	SURYA.V	50
17	821121103017	TAMILARASAN T	50
18	821121103018	VENKATACHALAM D	45
19	821121103019	VIJAY S	50
20		SANJAIMANI M	40
21		SINDHU G	50
22		SURUTHI A	45
23		MOHAMMED RIYAZ J	45


 SUBJECT INCHARGE
 (MS.D.SHARMILA)

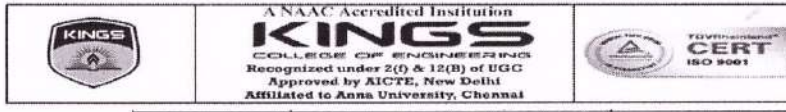

 HOD/CIVIL 30/08/23
 (DR.R.SARAVANAN)



DEPARTMENT OF CIVIL ENGINEERING
ACADEMIC YEAR 2022-23 (ODD SEM)
II YEAR CIVIL / III SEM - ATTENDANCE REPORT
BRIDGE COURSE II - ENGINEERING MECHANICS

S.No.	Reg. Number	Student Name	25/7	25/7	26/7	26/7	27/7	27/7	02/8	02/8	02/8	05/8	05/8	05/8	06/8	06/8	07/8	07/8
			3/4	5/6	5/6	7/8	5/4	5/6	7/8	3/4	5/6	5/6	7/8	3/4	7/8	3/4	7/8	5/6
1	821121103001	AKALYA J	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana	S.Archana
2	821121103002	ANITHA B	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha	B.Anitha
3	821121103003	ARULPANDIYAN A	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul	A.Arul
4	821121103004	ARUNKUMAR M	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar	M.Arunkumar
5	821121103005	HALITH A M	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth	H.Amth
6	821121103006	MADHAN D S	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan	M.Madhan
7	821121103007	MANIKKARAJ R	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj	R.Manikkaraj
8	821121103008	MATHANKUMAR S	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar	S.Mathankumar
9	821121103009	MOHAN S	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan	S.Mohan
10	821121103010	NAAVINIYAA G V	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa	G.V.Naaviniyaa
11	821121103011	NITHISH KUMAR T S	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish	T.S.Nithish
12	821121103012	PASHAGAN G (VOC)	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan	G.Pashagan
13	821121103013	PRAGADISH M	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish	M.Pragadish
14	821121103014	PRASANNA R	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna	R.Prasanna
15	821121103015	SARAVANAN K	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan	K.Saravanan
16	821121103016	SURYA V	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya	V.Surya
17	821121103017	TAMILARASAN T	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan	T.Tamilarasan
18	821121103018	VENKATACHALAM D	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam	D.Venkatchalam
19	821121103019	VIJAY S	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay	S.Vijay
20		SANJAIMANI M	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani	M.Sanjaimani
21		SINDHU G	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu	G.Sindhu
21		SURUTHI A	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi	A.Suruthi
23		MOHAMMED RIYAZ J	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz	J.Mohammed Riyaz
TOTAL STUDENTS			23	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
PRESENT			22	22	21	20	19	21	22	22	21	22	22	21	22	21	22	22
ABSENT			0	0	2	3	4	2	1	2	1	1	1	2	1	2	1	1
COURSE INCHARGE SIGN			[Signatures]															

KINGS Institute of Technology and Education



ACADEMIC YEAR 2022-23 (ODD SEM)
BC-ENGINEERING MECHANICS
STUDENTS ENROLLMENT

II YEAR CIVIL / V SEM

S.No.	Reg. Number	Student Name	Students Signature
1	821121103001	AKALYA J	J. Akalya
2	821121103002	ANITHA B	B. Anitha
3	821121103003	ARULPANDIYAN A	A. Arul
4	821121103004	ARUNKUMAR M	M. Arun Kumar
5	821121103005	HALITH A M	A. M. Halitha
6	821121103006	MADHAN D S	Madhan
7	821121103007	MANIKKARAJ R	R. Manikaraj
8	821121103008	MATHANKUMAR S	S. Mathankumar
9	821121103009	MOHAN S	S. Mohan
10	821121103010	NAAVINIYAA G V	G.V. Naaviniaa
11	821121103011	NITHISH KUMAR T S	Nithish
12	821121103012	PASHAGAN G (VOC)	G. Pashagan
13	821121103013	PRAGADISH M	M. Pragadish
14	821121103014	PRASANNA R	R. Prasanna
15	821121103015	SARAVANAN K	K. Saravanan
16	821121103016	SURYA.V	S. Surya
17	821121103017	TAMILARASAN T	T. Tamil
18	821121103018	VENKATACHALAM D	D. Venkatchalam
19	821121103019	VIJAY S	S. Vijay
20		SANJAIMANI M	M. Sanjaimani
21		SINDHU G	G. Sindhu
22		SURUTHI A	A. Suruthi
23		MOHAMMED RIYAZ J	J. Mohd Riyaaz



SUBJECT INCHARGE
(MS.D.SHARMILA)


25/07/23

HOD/CIVIL
(DR.R.SARAVANAN)

ENGINEERING MECHANICS

FUNDAMENTALS OF ENGINEERING MECHANICS

ENGINEERING MECHANICS: The subject of Engineering Mechanics is that branch of Applied Science, which deals with the laws and principles of Mechanics, along with their applications to engineering problems.

The subject of Engineering Mechanics may be divided into the following two main groups: 1. Statics, and 2. Dynamics

STATICS: It is that branch of Engineering Mechanics, which deals with the forces and their effects, while acting upon the bodies at rest.

DYNAMICS: It is that branch of Engineering Mechanics, which deals with the forces and their effects, while acting upon the bodies in motion. The subject of Dynamics may be further sub-divided into the following two branches: 1. Kinetics, and 2. Kinematics

KINETICS: It is the branch of Dynamics, which deals with the bodies in motion due to the application of forces.

KINEMATICS: It is that branch of Dynamics, which deals with the bodies in motion, without any reference to the forces which are responsible for the motion.

RIGID BODY: A rigid body (also known as a rigid object) is a solid body in which deformation is zero or so small it can be neglected. The distance between any two given points on a rigid body remains constant in time regardless of external forces exerted on it. A rigid body is usually considered as a continuous distribution of mass.

FORCE: It is defined as an agent which produces or tends to produce, destroys or tends to destroy motion. *e.g.*, a horse applies force to pull a cart and to set it in motion. Force is also required to work on a bicycle pump. In this case, the force is supplied by the muscular power of our arms and shoulders.

SYSTEM OF FORCES: When two or more forces act on a body, they are called to form a system of forces. Following systems of forces are important from the subject point of view;

1. **Coplanar forces:** The forces, whose lines of action lie on the same plane, are known as coplanar forces.
2. **Collinear forces:** The forces, whose lines of action lie on the same line, are known as collinear forces
3. **Concurrent forces:** The forces, which meet at one point, are known as concurrent forces. The concurrent forces may or may not be collinear.
4. **Coplanar concurrent forces:** The forces, which meet at one point and their lines of action also lie on the same plane, are known as coplanar concurrent forces.
5. **Coplanar non-concurrent forces:** The forces, which do not meet at one point, but their lines of action lie on the same plane, are known as coplanar non-concurrent forces.
6. **Non-coplanar concurrent forces:** The forces, which meet at one point, but their lines of action do not lie on the same plane, are known as non-coplanar concurrent forces.
7. **Non-coplanar non-concurrent forces:** The forces, which do not meet at one point and their lines of action do not lie on the same plane, are called non-coplanar non-concurrent forces.

FRICTION

INTRODUCTION:

If a block of one substance is placed over the level surface of the same or different material, a certain degree of interlocking of the minutely projecting particles takes place. This does not involve any force, so long as the block does not move or tends to move. But whenever one of the blocks moves or tends to move tangentially with respect to the surface, on which it rests, the interlocking property of the projecting particles opposes the motion. This opposing force, which acts in the opposite direction of the movement of the block, is called *force of friction* or simply *friction*. It is of the following two types:

1. Static friction. 2. Dynamic friction

STATIC FRICTION: It is the friction experienced by a body when it is at rest. Or in other words, it is the friction when the body tends to move.

DYNAMIC FRICTION: It is the friction experienced by a body when it is in motion. It is also called kinetic friction. The dynamic friction is of the following two types:

1. **Sliding friction:** It is the friction, experienced by a body when it slides over another body. 2. **Rolling friction:** It is the friction, experienced by a body when it rolls over another body.

LIMITING FRICTION: The maximum value of frictional force, which comes into play, when a body just begins to slide over the surface of the other body, is known as limiting friction. It may be noted that when the applied force is less than the limiting friction, the body remains at rest, and the friction is called static friction, which may have any value between zero and limiting friction.

COEFFICIENT OF FRICTION: It is the ratio of limiting friction to the normal reaction, between the two bodies, and is generally denoted by μ . Mathematically, coefficient of friction,

$$\mu = \frac{F}{R} = \tan \phi \quad \text{or} \quad F = \mu R$$

ϕ = Angle of friction.

F = Limiting friction, and

R = Normal reaction between the two bodies.

UNITS OF WORK:

The units of work (or work done) are :

1. **One N-m:** It is the work done by a force of 1 N, when it displaces the body through 1 m. It is called joule (briefly written as J), Mathematically. **1 joule = 1 N-m**

2. **One kN-m:** It is the work done by a force of 1 kN, when it displaces the body through 1 m. It is also called kilojoule (briefly written as kJ). Mathematically. **1 kilo-joule = 1 kN-m**

POWER: The power may be defined as the rate of doing work. It is thus the measure of performance of engines. e.g. an engine doing a certain amount of work, in one second, will be twice as powerful as an engine doing the same amount of work in two seconds.

UNITS OF POWER: In S.I. units, the unit of power is watt (briefly written as W) which is equal to 1 N-m/s or 1 J/s. Generally, a bigger unit of power (kW) is used, which is equal

CLOCKWISE COUPLE:

A couple, whose tendency is to rotate the body, on which it acts, in a clockwise direction, is known as a clockwise couple as shown in Fig. (a). Such a couple is also called positive couple.

ANTICLOCKWISE COUPLE:

A couple, whose tendency is to rotate the body, on which it acts, in an anticlockwise direction, is known as an anticlockwise couple as shown in Fig. (b). Such a couple is also called a negative couple.

CHARACTERISTICS OF A COUPLE:

A couple (whether clockwise or anticlockwise) has the following characteristics:

1. The algebraic sum of the forces, constituting the couple, is zero. 2. The algebraic sum of the moments of the forces, constituting the couple, about any point is the same, and equal to the moment of the couple itself. 3. A couple cannot be balanced by a single force. But it can be balanced only by a couple of opposite sense. 4. Any no. of co-planer

couples can be reduced to a single couple, whose magnitude will be equal to the algebraic sum of the moments of all the couples

EQUILIBRIUM: If the resultant of a number of forces, acting on a particle is zero, the particle will be in equilibrium. Such a set of forces, whose resultant is zero, are called equilibrium forces. The force, which brings the set of forces in equilibrium is called an equilibrant.

PRINCIPLES OF EQUILIBRIUM: Though there are many principles of equilibrium, yet the following three are important from the subject point of view : 1. **Two force principle:** As per this principle, if a body in equilibrium is acted upon by two forces, then they must be equal, opposite and collinear. 2. **Three force principle:** As per this principle, if a body in equilibrium is acted upon by three forces, then the resultant of any two forces must be equal, opposite and collinear with the third force. 3. **Four force principle:** As per this principle, if a body in equilibrium is acted upon by four forces, then the resultant of any two forces must be equal, opposite and collinear with the resultant of the other two forces.

METHODS FOR THE EQUILIBRIUM OF COPLANAR FORCES: Though there are many methods of studying the equilibrium of forces, yet the following are important from the subject point of view : 1. Analytical method. 2. Graphical method.

LAMI'S THEOREM: It states, "If three coplanar forces acting at a point be in equilibrium, then each force is proportional to the sine of the angle between the other two." Mathematically,

$$\frac{P}{\sin \alpha} = \frac{Q}{\sin \beta} = \frac{R}{\sin \gamma}$$

CENTROID AND MOMENT OF INERTIA

CENTRE OF GRAVITY: The point, through which the whole weight of the body acts, irrespective of its position, is known as centre of gravity (briefly written as C.G.). It may be noted that everybody has one and only one centre of gravity.

CENTROID: The plane figures (like triangle, quadrilateral, circle etc.) have only areas, but no mass. The centre of area of such figures is known as centroid. The method of finding out the centroid of a figure is the same as that of finding out the centre of gravity of a body.

KINETICS: It is the branch of Dynamics, which deals with the bodies in motion due to the application of forces.

KINEMATICS: It is that branch of Dynamics, which deals with the bodies in motion, without any reference to the forces which are responsible for the motion.

PRINCIPLE OF DYNAMICS:

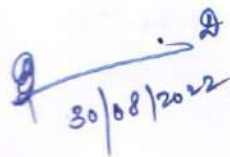
1. A body can possess acceleration only when some force is applied on it. Or in other words, if no force is applied on the body, then there will be no acceleration, and the body will continue to move with the existing uniform velocity. 2. The force applied on a body is proportional to the product of the mass of the body and the acceleration produced in it.

NEWTON'S LAWS OF MOTION: Following are the three laws of motion, which were enunciated by Newton,

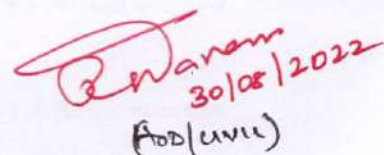
1. Newton's First Law of Motion states, "Everybody continues in its state of rest or of uniform motion, in a straight line, unless it is acted upon by some external force."
2. Newton's Second Law of Motion states, "The rate of change of momentum is directly proportional to the impressed force, and takes place in the same direction, in which the force acts."

$$F = ma = \text{Mass} \times \text{Acceleration}$$

3. Newton's Third Law of Motion states, "To every action, there is always an equal and opposite reaction."

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(SUBJECT INCHARGE)

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