

Semester -1: M.A Geography

Course opted	COURSE CODE	COURSE NAME	CREDITS
CC-1 CORE COURSE	GEO-M-101	Geomorphology	05
CC-2 CORE COURSE	GEO-M-102	Climatology and Oceanography	05
CC-3 CORE COURSE	GEO-M-103	History of Geographical Thought	05
CC-4 CORE COURSE	GEO-M-104	Representation and Analysis of Statistical Data (Practical)	05
AECC-1 (Ability Enhancement Compulsory Course)		Environmental Sustainability Swachha Bharat Abhiyan Activities	03 02

Unit-1

1. Theories regarding evolution of earth crust
2. ISOSTASY, Concept, theory and Application
3. CONTINENTAL DRIFT THEORY
4. PLATE TECTONIC THEORY
5. Sea Floor Spreading

Maharaja College, Ara V.K.SU. Bihar

M.A. SEMESTER -1

GEOGRAPHY

Questions for Assignment

Answer any two questions

Paper-GEO-101

GEOMORPHOLOGY

1. Explain the concept of Isostasy and its application in India.
2. Critically examine the morphogenic evolution models put forwarded by Davis, Penk and King.
3. Discuss the landform of Periglacial region with suitable sketches.

Paper-GEO-102

CLIMATOLOGY AND OCEANOGRAPHY

1. Explain about heat budget and heat balance.
2. What is Air mass? Present its classification and distribution.
3. Discuss about the distribution of ocean deposit.

Paper-GEO-103

HISTORY OF GEOGRAPHICAL THOUGHTS

1. Explain the contribution of Arab geographers.
2. What is Model in Geography? Explain it.
3. Write an essay on Behavioral Geography or Functionalism in Geography.

Prof. Sanjay Kumar

Head

P.G.Deptt of Geography

Maharaja College, Ara

Maharaja College, Ara V.K.SU. Bihar

GEOGRAPHY

M.A. SEMESTER -1 Paper- GEO-104

Practical works, Exercise -1

Q. 1. Draw Proportionate circles for the data given below:

Name of the Blocks	Population
1. Shahpur	185911
2. Ara	369644
3. Barhara	194439
4. Koilwar	169564
5. Sandesh	90259
6. Udwantnagar	132258
7. Behea	139374

Q. 2. Prepare wind rose diagram of a sample place with the help of following data:

Direction of Wind	NE.	E.	SE.	S.	SW.	W.	NW.	N.	Calm Days
No. of Days	25	59	62	33	81	38	10	21	36

Q. 3. Draw Band Graph for the following data:

Production of paddy in sample places (in ton)

Years → Country ↓	1951	1961	1971	1981	1991	2001	2011
A	740	907	1003	1288	1535	1714	1944
B	1253	1517	1832	2342	2904	1662	2010
C	760	349	1103	1328	1570	1944	2404
D	524	612	720	870	1083	1322	1576
E	907	1050	1288	1568	1653	1815	2222

Q. 4. Calculate the correlation of the following data using Karl Pearson method.

Investment(in Rs.000)	10	20	30	40	50	60	70	80	90	100
Gain (in Rs. Lakh)	2	4	8	5	10	15	14	20	22	30

Prof. Sanjay Kumar

Head

P.G.Deptt of Geography
Maharaja College, Ara

Study Material for PG PART/SEMESTER-1

PAPER-101

UNIT-1

Theories regarding evolution of earth crust

POINTS TO REMEMBER

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G.Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

SI No.	Scholar	Hypothesis	Year
1	Buffon , French scholar	एक तारक परिकल्पना	1745
2	Emanuel Kant, German scholar	Gaseous hypothesis	1755
3	Laplace, French scholar	Nebular hypothesis	1796
4	Roche, French scholar	Revised nebular hypothesis	
5	Chamberlin and Moulton, American scholar	Planetesimal hypothesis	1904
6	Jeans & Jeffrey's, British scholar	Tidal hypothesis	1919, 1928
7	Russel & Lyttleton,	Binary star hypothesis	1937
8	Hoyle & Lyttleton, British scholar	The Nova hypothesis	1939
9	Otto Schmidt, Russian scholar	Dust and Gaseous hypothesis	1943
10	George Lemaitre & Robert Wagoner	Big Bang hypothesis	1967

Study Material for PG PART/SEMESTER-1

PAPER-101

UNIT-1

“ISOSTASY, Concept, theory and Application”

POINTS TO REMEMBER

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G.Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

- **Isostasy** word derived from the Greek word **Isos'** + **Stasio** means = equal or stand still.
- Isostasy refers to the state of equilibrium between different physical features (blocks) found on the earth and rotating/moving earth.
- High elevated Himalayas, plateaus of different heights, deep valleys and other features have different height, than how they are still at equilibrium state while our earth is rotating and revolving continuously.
- Why high elevated features are not fell down?
- First time the term **Isostasy** was coined by American Geologist **Dutton** in **1889**.
- Geodetic survey of India was conducted in 1859 under the direction of Sir George Everest. He selected two places **Kalyan** and **Kalyanpur** among several others.
- Kalyan is nearer to Himalaya whereas Kalyanpur is very far from Himalaya. Both triangulation and Geodetic survey were conducted for the determination of their latitudes.
- After conducting both the surveys, differences in latitudes occurred of 5.236". According to the scientists it should be 15.885".

- It means Himalaya is not attracting pendulum as per its height. It should be more.
- This gravity anomaly / low gravity attraction shown by Himalaya is the root cause of Isostasy.
- Scientist like Pratt, Airy, Jolly, Haskenian, Helford and Boby and Arthur Holmes has put their hypothesis regarding Isostasy.
- **According to Pratt** - Bigger the column lesser the density, smaller the column greater the density.
- Pratt viewed that there is a **LEVEL OF COMPANSATION** above which anomaly (variation) is found in density of different blocks of the earth and equal density is found below this level.
- For the presentation of his hypothesis Pratt has used the blocks of lead, iron, antimony, copper and zinc of equal weight and same width.
- Pratt has used utensil filled with mercury and poured all the blocks in it.
- He fined that blocks are seen of different height but they maintains depth equally at level of compensation.
- According to Pratt Isostasy prevails as all the blocks have same/ equal depth but have unequal density above this level so as to different blocks of the earth.
- **According to Airy** - The blocks of the earth are like Iceberg and a boat floating in water. Their $1/9^{\text{th}}$ part is below water and $1/10^{\text{th}}$ part is above water and is seen.
- Airy assumed that SIAL is floating in SIMA.
- Airy stated that blocks have no differences in their density as they are all made up of SIAL. Hence, they have equal density.
- Airy has taken wooden blocks of same thickness but of different height and put it all in water filled bouquet.
- After this, Airy has taken copper rods of same thickness but of different heights and put it all in mercury filled bouquet.
- The experiment revealed that the block of different height have deep root beneath the earth crust proportionately.
- Airy has put forward the concept of **Zone of Compensation**.

- Airy has the view that though Himalaya has great height but its $1/9^{\text{th}}$ part is in SIMA. Only $1/10^{\text{th}}$ part is above the SIMA or earth crust, therefore, it exerts less gravitational pull/attraction towards plum-bob.
- Airy of the view that higher blocks have low density while lower blocks have high density. And so as to gravitational attraction.
- **Helford and Bobby** has find same anomaly during geodetic survey in America during 1910.
- During their study they found the situation like Pratt and termed the level of compensation as **Isostic Level** at 100 kms depth.
- Bobby has used eight (8) different metals like silver, zinc, pyrite, tin, iron, nickel, copper and lead.
- They assumed the distribution of blocks of different density according to height.
- Practically, blocks of different density are distributed or found horizontally not vertically as Halfords and Bobby has stated.
- **Jolly** has support the law of floatation and give the concept of **Belt of Compensation** which is 16n kms wide made up of SIMA. In this belt (density 3) low density blocks (density 2.4-2.7) floats and maintains the isotactic balances.
- **Heskenian** was of the view that in a same block vertically density difference is found. He stated that on this earth, different blocks have different density and in each block density differences is also found vertically.
- **Holmes** has postulated his hypothesis in 1940 in this regard.
- **Prof. Ménége** has found most of the part of Indian Ocean and large part of Mediterranean Sea is under ideal condition of Isostasy.
- In India, high isostatic condition is found in Deccan plateau.
- **The Isostasy hypothesis started in India and fails in India too.**

By

Prof. Sanjay Kumar

Associate Prof and HOD

P.G.Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

Study Material for PG PART/SEMESTER-1

PAPER-101

UNIT-1

“CONTINENTAL DRIFT THEORY “

POINTS TO REMEMBER

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G.Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

- **Antonio Snider**, a French scholar has assumed about continents movement for the first time in 1858.
- In 1908-10, an American geologists **F.G.Taylor** has published and support the aspect of continental drift in an unorganized way.
- In 1912, German scholar, Alfred Wagner has postulated the concept of Continental Drift in German language and was translated into English in 1924.
- Wagner was originally a climatologist. He collected large number of evidences in support of past and present climatic situation.
- He viewed that all the present continents were at one place during ancient time.
- He argued that either climate of the continents have changed or continents have move from their original climate places.
- According to Wagner up to middle Mesozoic era all continents were one named **Pangaea**.
- Pangaea was surrounded with water body named **Panthalasa**.
- In later stage, **Arthur Holmes** called Pacific Ocean to Panthalasa.
- Tethys, A geosyncline was exited along the central part of Pangaea.
- The northern part of Pangaea was called **Laurentia** included present America and Greenland.

- The northern part including central Asia and Europe is called **Angara land**.
- Rest of the part i.e. southern part is termed as **Gondawana land**.
- Gondawana land was the part situated in the **south of Tethys**.
- According to Wagner, by that time equator was passing through Laurentia and South Pole was from Netal.
- Wagner stated that continental drifting started in carboniferous age.
- Continents drifted due to internal movement in the earth. Continents drifted towards two directions.
- Eurasia and African continent drifted towards north.
- Both the Americas towards west and north-west. It resulted into creation of Indian Ocean and Atlantic Ocean respectively.
- Continental drifting was continued during Mesozoic era.
- During Cenozoic epoch Alpine/ new fold mountains created and volcanic activity also took place at large scale.
- Wagner was of the view that force of buoyancy and gravitational attraction of the moon were responsible for northward and westward movement of continents respectively.
- Due to continental drifting, position of equator and north and South Pole position have changed its positions.
- During Silurian period equator was passing through Norway. At the end of Carboniferous period it passes through central Europe and during Tertiary it passes through Mediterranean and near to Himalaya.
- Wagner stated that continents are made up of SIAL.
- Several evidences are present in the support of continental drift theory.
- Plate tectonic theory has supported the view of Wagner's continental drift.

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G. Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

Study Material for PG PART/SEMESTER-1

PAPER-101

UNIT-1

“PLATE - TECTONIC THEORY “

POINTS TO REMEMBER

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G.Deptt of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India

- Plate Tectonic theory is based on two words Plate+Tectonics.
- Plate term was coined by Tuzo Wilson in 1965.
- In 1967, Macanzee and Parker have put the base of plate tectonic by **Paving Stone Theory**.
- In 1968 Morgan has explained but was not popular.
- In 1968 Le Pichan has given data's in support of tectonic activities.
- **Plates** are rigid but moving blocks of the earth having average thickness of 100 kms through which internal energy tries to come out.
- Folding, faulting, warping, volcanic activity, earthquake, submergence, emergence, tension and other such activities which happen along the plate margins are called **tectonic activities**.
- **Convection current** (concept given by Arthur Holmes) is responsible for plate movement.
- All plates have relative movements.
- There are two types of plate- major plates (6) and minor plates (20).
- 1. Pacific, 2. American, 3. Eurasian, 4. African 5. Indo-Australian and 6. Antarctic plates are examples of **major plates**.
- Nazca, Cocos, Caribbean, Scotia, Philippine, Iranian, Indian and Hellenic plates are some examples of **minor plates**.
- Plates are of three margins-

- a) **Constructive plate margin**- Here two plates diverge into two different parts from a centre. Therefore, magma come out on the surface of ocean and solidified quickly due to water presence. That solidified magma created / constructs the surface. Hence is called constructive plate margins.
- b) **Destructive plate margins** – Here two plates come from two different directions and converge /submerge along subduction zone. Tectonic activities start to the margins .Destruction of plate due to convergence occurs, hence are called destructive plate margins.

Destruction takes places by three types:

1. Here two continental plates collides with each other. Collision of Chinese massif and Indian plate give rise to Himalaya Mountain.
2. Here one continental and one oceanic plates collides with each other. Collision of America and Pacific plates give rise to Andes' and Rocky's mountains.
3. Here two oceanic plates collides with each other. Collision of Indo-Australian plate with Pacific Ocean give rise to Arc shape oceanic mountain. Starts from Sakhalin to Cocos Island popularly known as **Garland of Asia**.

c) **Conservative plate margins** – Here two plates slides into different directions. Transform fault is created but there is no construction or destruction of plates are seen along this plate margin. Hence is called conservative plate margin.

- Constructive plate margins are found along Mid-Oceanic-Ridge in Atlantic Ocean and in Indian Ocean.
- Destructive plate margins are found along Tethys, around Pacific Ocean and some other places.
- Conservative plate margins are best found along western side of America at San Andreas fault. Where Pacific and American plates slip off each other.

By

Prof. Sanjay Kumar

Associate Prof. and HOD

P.G.Dept of Geography

Maharaja College, Ara, V.K.S.Univ, Bihar, India