"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

B.Sc. Part- II (Astrophysics)

Fundamentals of Astrophysics

Surprise Test

Date : 02/03/2023
Day: - Friday

Total Marks: 20
Time :- 2pm to 3pm

Instructions:-

1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Use of log table and calculator is allowed.

Q1) Select correct alternative. **(04)**

1. In geocentric model …… is at centre of universe.

a) earth b) moon c) sun d) mars

2. Tychonic proposed his …… model.

a) geo centric b) sun centric c) moon centric d) none of above

3. The 1st magnitude starts are about ….. times brighter than 6 magnitude starts.

a) 2.5 b) 4 c) 1 d) 6

4. The Photographic method is sensitive to …… light.

a) photoelectric b) UV c) IR d) Microwave

Q 2: Short answer question **(16)**

1. Explain with diagram the Copernicus heliocentric model.
2. Explain the term photoelectric effect.
3. Explain in brief the Tychonic model.
4. Explain the term luminosity of stars .

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

B.Sc. II (Astrophysics)

Fundamentals of Astrophysics

Surprise Test

Attendance Sheet

Date : 02/03/2023

Roll. No.	Name of Candidate	Sign
7732	Sahil Patnekar	Patil.
7769	Jemmana Shreeyanshree S.	
7770	Nasabe Sadd S.	Saad.
7717	Vaishvi V. Sutar.	VSutar
7771	Kilare Rutik Sunil	Rutik.
7772	Khot Rutika Sambhaji	Khot.
7773	More Omkar Nandkumar	More
7718	Vedant Malgaonkar	Vedant
7774	Pathan Misam Ashpak	Pathan
7775	Patil Dhanashree M.	Patil
7776	Sutar Shashant Vilas	SSutar

Teacher Incharge..... Ckamble

(Shri C.J. kamble)

Ckamble

Head of the
Department of Physics
Vivekanand College, Kolhapur

VIVEKANAND COLLEGE KOLHAPUR (Autonomous) ESTD JUNE 1964

"Dissemination of Education for Knowledge, Science and Culture"
-Shikshanmaharshi Dr. Bapuji Salunkhe

Shri Swami Vivekanand Shikshan Sanstha, Kolhapur

Vivekanand College, Kolhapur (Autonomous)

Department of Physics

B.Sc. II (Astrophysics)

Fundamentals of Astrophysics

Surprise Test

Result

Date : 02/03/2023

Roll. No.	Marks	Roll. No.	Marks
7769	02		
7770	09		
7771	12		
7772	11		
7773	09		
7774	-		
7775	07		
7776	-		
7777	-		
7733	10		
7717	02		
7718	08		
7728	10		

Teacher Incharge..... Ckamble .....

(Shri. C. J. Kamble)

Ckamble

Head of the
Department of Physics
Vivekanand College, Kolhapur

VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Autonomous)

Name : Sahil Patnekar .

Roll.no: 7733

।। ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ।।
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27744

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. :

Roll No. : 7733

Class : B.Sc - II nd

Subject : Astrophysics.

Test / Tutorial No. :

Div. :

07+03 = 10/20 fail

Q A.

Q1. In Geocentric model Earth. is at center of Universe. 1

Q2. Tychonic proposed his Geo-heliocentric model. 1

Q3. The first magnitude stars are 100 times brighter than 6 magnitude stars. 0 X
(a) 100 , (b) 50 (c) 2000 (d)

Q4. The photographic method is sensitive to Blue light. 1

1/3

Q B.

1. Explain with diagram the Copernicus helio centric model. ~~Explain the te~~

2. Explain the term photoelectric method.

3. Explain ~~the~~ ~~term~~ in brief the tychonic model.

4. Explain the term luminocity of Stars.

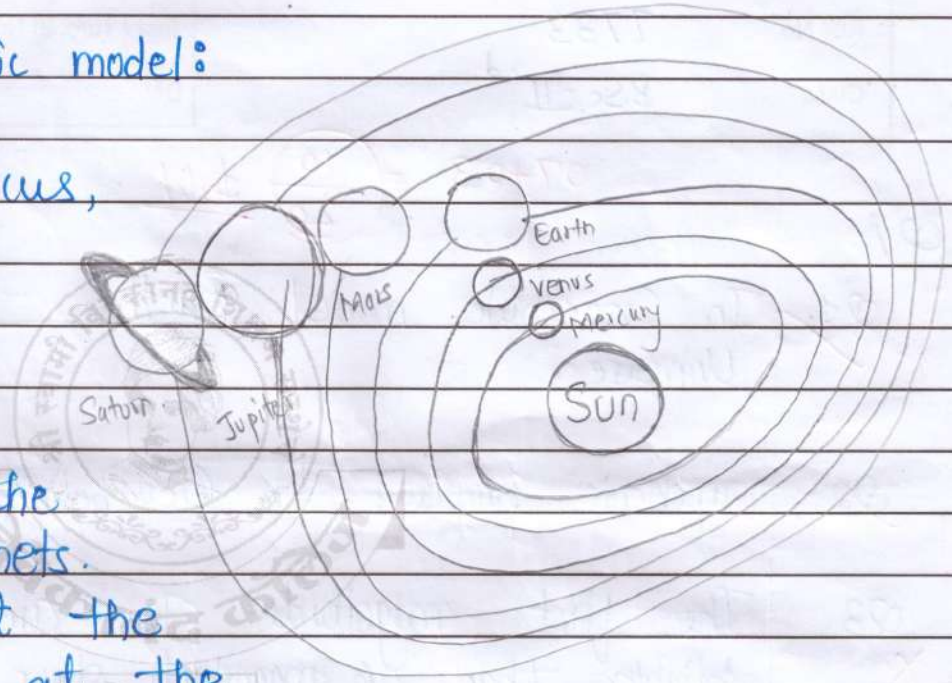
5. The magnitude of Sun and moon is −6.74 & 12.73. Calculate the difference between luminosities between Sun & Moon.

6. The magnitude of Sun & Cyrus is & −1.45. Calcalate the difference between Luminocities between them.

Q B.

1.

→ Copernicus heliocentric model:



In 1542 AD, Copernicus, an polish ~~astr~~ scientist and mathematician proposed a new theory regarding the revolution of planets. He proposed that the Sun is situated at the center and all planets revolved around it in an ~~ep~~ ~~slip~~ elliptical path known as orbits. Every planet had their own ~~p~~ fixed paths. Copernicus waited until his own death to publish his theory. The order of planets was Sun, Mercury, Venus, Earth, Mars, Jupiter and Saturn. He also predicted that when the planet is near the sun, it will cover more cred in less time (that point is called as apoghee) where as when it is far from Sun, it will relvolve slowly (that point is known as perighee).

3

2.

→ The effect ~~in to~~ when an metal is exposed to a high intensity light, discharge of electrons takes place at the surface of the metal. When the luminocity is measured by this method, it is called as Photoelectric method.

3. Tychonic Model:-

This model was proposed after the copernicus model. In this model the sun orbited the Earth. This model is also known as Geo-heliocentric model. The order of celeastial bodies was, Sun, Mercury, Venus, Mars, Jupiter & Saturn. Tychon failed to prove the movement of stars

4. Luminocity of a Star is defined as the total amount energy emitted per unit time. i.e $\left[P = \frac{E}{t}\right]$ It can also be defined as the total amount of electromagnetic energy ~~or~~ radiated by a body per unit time, is called as Luminocity.

Luminocity is measured in two ways,

① In visible light

② Bolometer. or radiation.

Electromagnetic energy ^ is sensitive to blue light.

।। ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ।।
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27749

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

①Desai surekha Tanaji.

Suppliment No. :

Roll No. : 7728

Class : PCAp

Subject : Astrophysics

Test / Tutorial No. :

Div. : E.

01 + 08 = ~~10~~ / 20 Salil 10/20

Multiple choice question

① In jiocentric model earth is at centre of universe

② tychonic Purposed his model

③ The 1st magnitude star are about 2.5 time brighter than 6 magnitude star

④ The photographic method is sensitive to Photoelectric light.

Answer any 4 of the following

Explain the diagram the coperica: helioce
Explain the term Photoelectric term
Explai the tychonic Method. /system
Explain term luminosity of stao.

① The magnitude of the sun and full moon is −26.74 and −12.73 calculate the diff^n betwee luminosity in sun and full moon.

② magnitude sun and sirus is -26.74 and -1.45 calculate the diff' ~~and~~ bet lumnicity

- ① Copernicus model.

The copernicus model. is the Purposed by the Alxandrian and mathamacian. this model is also known the ~~g~~ j o jiocentric model. this model Purposed in 150 AD. ~~This mode~~ In this model the earth is at the centre and sun revolve around it. they explain in the mercury, venus, sun, moon, jupitor, saturn. ~~this model is not~~ give exact ~~the Purpose so ex this model~~ explain

② tychonic system.

King fedric of denmark build an observetry ~~for~~ tycho Brahe. it is measure the Position of Plannet with high accuracy. It was the necked observetry with the ~~quarte~~ quarter circle measurment device. he careFully analysis the observation and able to the record the Position of Plannet with best the Possible accurately (10 time more) for necked eyeobservation. ~~The tycho Brahy was not~~ the earth is revolve around it then the Position of stare should change over it year. The tycho Brahe was not able to detect the Position of star. hence he was ~~able~~ belive that the earth steal at the centre of universe and sun revolve around it.

③ Photoelectric method.

The light for star ~~d~~ Focacused on the the Photosensitive cathod (C) then Passing throw the objective (O) of the telescope, Fibri lense (L) this are the arrangement of Photoelectric method.

electrons are ~~effec~~ attracted due to the Photoelectric effect. then the this current throw by anode (-) due to the (+) Potential applied the Power.

0.2 luminosity of star

all the over we sees the number of self luminous ~~in~~ ~~th~~ star in the entire sky. the total amount of electromagntic energy per unit time at on the object. is called the luminosity. 5000 stars are visible to to necked eye in the universe. The luminosity measure in two flow which is ① visule ② Bolometric. The formula of luminosity of star ~~is~~ Formula is

$$P = \frac{E}{t} = \frac{\text{Jowle}}{\text{time}} \text{ / watt.}$$

The sun is Bolometric object this is 3.9×10^{24} W are the luminosity in Bolometric method. the celistial object observed in the relative motion between the celistial body and observer.

Q.2.

(5) (1) given

magnitude of sun = −26.74

magnitude of moon = −12.73

Find ?

the diffnc bet luminosity

Formula

$\frac{\text{sun}}{\text{moon}} = -0.4\,(m_1 - m_2)$

$= (-0.4 \times m_1) + (0.4 \times m_2)$

$= -0.4 \times -26.74 + -12.73 \times (0.4 \times -12.73)$

$= \text{Antilog}\ (10.69 + -5.092)$

$= \text{Antilog}\ (5.598)$

$= 396278.034$

$= 3 \times 10^5\ W$

(2) given

magnitude of sun = −26.74

magnitude of sirus = −1.45

Formula

$\frac{\text{sun}}{\text{sirus}} = -0.4\,(m_1 - m_2)$

$= \text{Antilog}\,(-0.4 \times m_1) + (0.4 \times m_2)$

$= \text{Antilog}\,(0.4 \times -26.74) + (0.4 \times -1.45)$

$= \text{Antilog}\ (10.69) + (-0.58)$

$= \text{Antilog}\ (10.69 - 0.58)$

$= \text{Antilog}\ (10.11)$

$= 12882495516.9$

$= 1 \times 10^{10}\ W$

0.8

॥ ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ॥
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27748

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor

Suppliment No. :

Roll No. : 7717

Class : BSc II

Subject : Astrophysics

Test / Tutorial No. :

Div. :

02/10 Patil

1 1] In geocentric model Earth is at the centre of univers

0 2] Tyconic proposed his _____ model

0 3] 1st magnitude star are about 50 times brighter tan 6 magnitude star
a] 100 b] 50 c] 1000 d] 25

1 4] The photographic method is sensitive to Blue light

a 2 Answer Any 4 of the following

1] Explain with Did copernicus Helio model.

2] Explain ~~with~~ the term photoelectric method

3] Explain in brief Tyconic system.

a] Explain the term luminostic of star

।। ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ।।
– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27743

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. :

Roll No. : 7726

Class :

Subject :

Test / Tutorial No. :

Div. :

04 + 13 = 17/20 $\frac{17}{20}$ Patil

Multiple choice que

1) In Geocentric model ____ is at the ce of universe

2) Tychonic proposed his ____ model

3) The 1st magnitude star are about ____ br er than 6 magnitude star
i) 100 ii) 50 iii) 2000 iii) 2.5

4) The photographic is sensitive to ____ ligh

Q2. Any four of the following

1) Explaine with diagram Kopernican Heliocentric
2) Explaine the term photoelectric method
3) Explaine Tychonic system
4) Luminosity of stars
5) i) The magnitude of sun and full moon -26 and -12.73 calculate difference betn luminosi in sun and full moon
ii) The

the magnite of sun and sirus -26.74 and -1.45 calculate the differe bet^n sun and sirus

Q1 In geocentric model earth is at center of universse.

Tychonic proposed his Geoheliocentric model

1st magnitude of stars is about 1000 brighter than 6 magnitude of star

photographic plate is sensitive to blue light

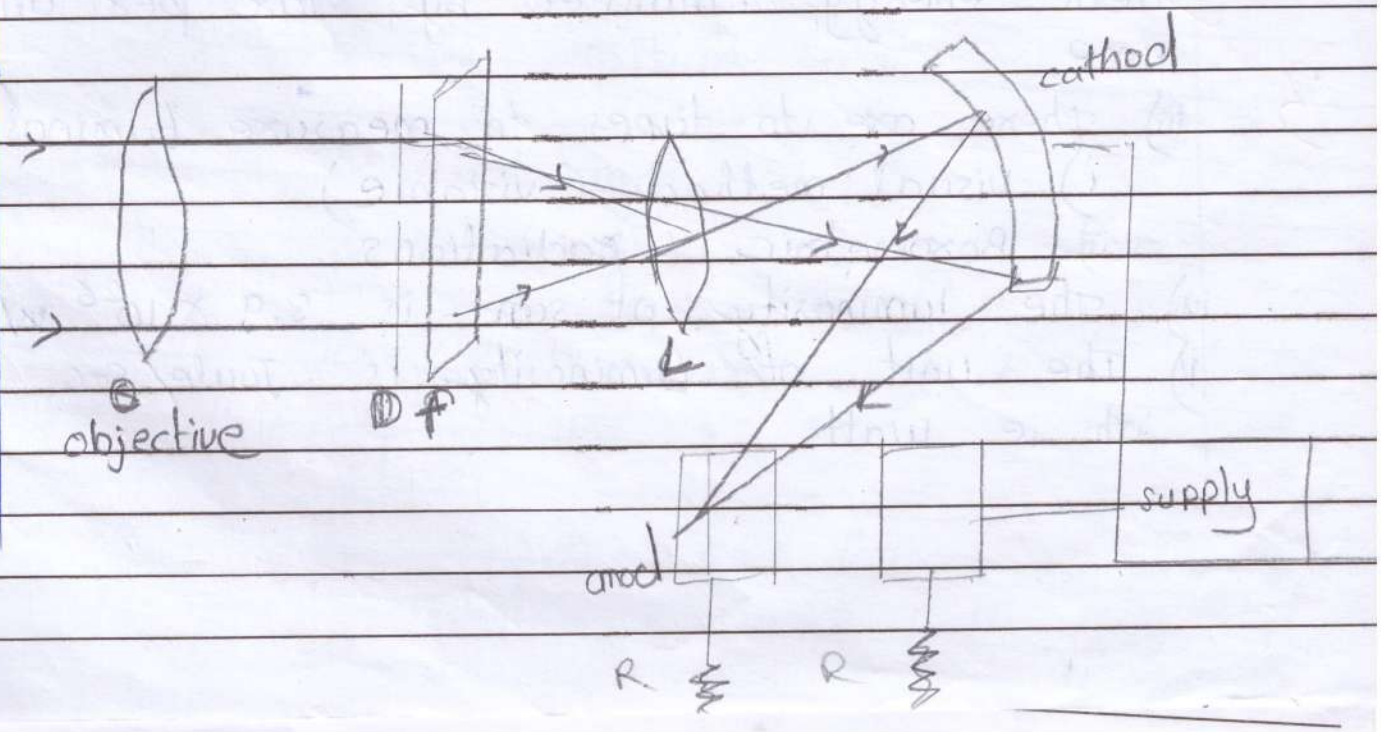
04

Q2 Copernicans Heliocentric model

- Polish astromer and mathemathisian proposed is heliocentric model.
In 1540 AD
- In Heliocentric model sun is at the centre of the universse and all plannets are revoling around it of copernicus
- there are 2 mean reasons to assum that sun is at the centre
  i) ptolemey model is good to predict the position of plannets but precise its assump predicition of ptolmey go worse an worse
  ii) Rectrograde motion of the plannets, rectrograde motion of earth is consider as the earth also revolving around the sun.

- Galileo's telescope observed this positions of plannets and ~~supp~~ and Galileo's support to this heliocentric model.

Q2 2) Photoelectric method.



Luminosity measured by visual methods
i) photographic method
ii) photoelectric method.

Photoelectric method.
photoelectric method is used to ~~measure~~ direct measure the luminosities of star by using photoelectric cell. This method is use in 1940. ~~Et~~ electrons emmitted to catho light passing from objective (O), diagra (D) ~~fe~~ filter (F) and electrons emmitte to cathod and it attract to anode by sup ng electric supply. electricity flows & vol measure by amplitate Resistance R.

3

4) Luminosities of stars

i) Luminosity is nothing but brightness of stars.
ii) Luminosity is define as total electrom netic energy emmitted by star per unit time.
iii) There are to types to measure Luminosity
i) visual method (visiable)
ii) Bolometric (radiations
iv) The luminosity of sun is 3.9×10^{26} W
v) The unit of Luminosity is Joule/sec ith ie Watt

3

Name :- Vedant P. Mangaonkar.

।। ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ।।

– शिक्षणमहर्षी डॉ. बापूजी साळुंखे 27746

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. : 1

Roll No. : 7718

Class : SY BSc

Subject : ASTRO PHYSICS

Test / Tutorial No. : 1

Div. :

05+03 = 08/20 Total

Q1. Multiple Choice question.

1) In geocentric model ---- is at

2) Tychonic proposed his ---- model

3) The 1st magnitude stars are about ----- times 6 magnitude stars.
a) 100 2) 50 3) 1000 4) 2.5

4) The photographic method is sensitive to ---- light.

Q2. 1) Explain with diagram the copernican Heliocentric model.
2) Eplain the the term photoelectric method.
3) Expla
4) Explain the term luminosity of stars.
5) The magnitude of sun and moon -26.74 and -12.73 calculate the difference between luminosities of and sun and full moon.

b) The magnitude of sun and scirus -26.74 and

ANSWER :-

Q1. i) Earth
ii) Geoheliocentric
iii) SO
iv) blue

1/3

Q2.

1) Copernicus proposed his model about position of earth sun and nearby planets.
His model is known as copernican Heliocentric model.
In this mode the sun is at the eescentric or at the centre of solar system.
All the planets including earth are revolving around the sun as a centre.
In his model planets are arranged in their perticul orbits as follows:
Sun → mercury → earth → mars → jupiter → saturn.
The arrangement of the planets is shown in the following figure :-

3

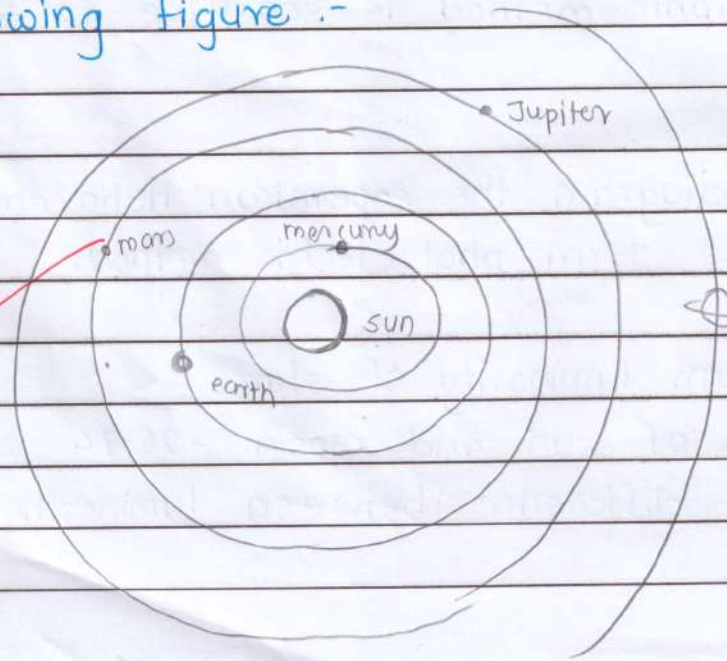


fig (A)

In the fig (A) we can see the copernican model i.e. Heliocentric model as sun at its centre.

2) Photoelectric Method :-

As we can not observe stars at farthest distance from earth by naked eyes or with ordinary telescope. Scientists introduced Photoelectricmethod.
In this method the light or electromagnetic radiations which cannot be observed easily are observed.
The key component 'photographic plate' is exposed to the radiations radiated from the stars and planets at far distance.
Due to this exposure there is an impression of radiations on the photographic plate.
This impressions are further studied under the equipment known as spectrometer.
This impressions of radiations can provide us various information about that particular celestial body.
The major Disadvantage of photographic method is that the photographic plate or the method is sensitive to the blue light.
Thus exposure to blue light can damage it and observevations may occur wrong.

2022-23

2.3) Luminosity Of STars :-

Luminosity of stars can be defined as the intensity of light radiations coming out from the star.

Luminosity can be said as it is inversly proportional to the distance of the source from the observer.
As distance increases the luminosity Decreases.
Lumen is the unit to measure the lumenosity.
and watt.
~~Luminosity has its levels~~
Luminosity can be determined by following methods

1) Visible method :- in this method we can easily tell the intensity of light coming out from star. it is a comparison method that can be used while observing two or more sources.

2) photographic method :- ~~tin~~ In this method photographic plate is (sensitive to light) exposed to the light and its impressions on photographic plate are further studied

5