Department of Physics

Vivekanand College, Kolhapur (Autonomous)

Notice for Internal Examination in Physics for B.Sc. – I and II

It is hereby informed that, students of B.Sc. – I and II should note that their Internal Examination in Physics will be conducted as per following time – table.

Date	Time	Class	Subject	Topics
Monday, 10/04/2023	11.00 to 12.00 AM	B.Sc. – II (Astrophysics)	Paper – III	Galaxies
			Paper – IV	Fluids
Tuesday, 11/04/2023	10.00 to 11.00 AM	B.Sc. – I	Physics Paper – III	Network Theorem
			Physics Paper – IV	Vector Algebra
Tuesday, 11/04/2023	10.00 to 11.00 AM	B.Sc. – II	Physics Paper – VII	Theory of Radiation
			Physics Paper – VIII	Interference

Seating Arrangement (Engineering Building)

Sr. No.	Class	Room / Block No.	Roll No.
1)	B.Sc. – I	301 (03rd Floor)	7201 to 7252
2)		312 (03rd Floor)	7253 to 7285
3)		313 (03rd Floor)	7286 to 7318
4)		314 (03rd Floor)	7319 to 7352
5)		315 (03rd Floor)	7353 to 7390
6)		319 (03rd Floor)	7392 to 7422
7)		B.Sc./MSc Hall 01 (04th Floor)	7428 to 7557
8)		B.Sc./MSc Hall 02 (04th Floor)	7558 to 7602
9)	B.Sc. – II	BCS Lecture Hall (04th Floor)	7701 to 7740
10)		B.Sc./MSc Hall 02 (04th Floor)	7741 to 7777, 7976, 7983, 7984, 7990
11)	B.Sc. – II (Astrophysics)	Physics Practical Lab 02	

Nature of Question Paper

Q.1) Select correct alternative (10 Marks)
Q.2) Long answer type question (10 Marks, Attempt any One)
Q.3) Short answer type question (10 Marks, Attempt any Two)
Total Marks: 30 Marks

VIVEKANAND COLLEGE ESTD JUNE 1964 KOLHAPUR - 416003

HOD, Physics
Head of the
Department of Physics
Vivekanand College, Kolhapur

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Internal Examination 2022-23

PHYSICS-DSC -1001D

B.Sc. – II, Sem – IV (Thermal and statistical physics II and Optics)

Time: 30 Minutes Marks: 30

Q. 1. Select Correct Alternatives **(5)**

1. Two sources are said to be coherent if they have .....

   (a) same wavelength (b) constant path difference

   (c) constant phase difference (d) all the above

2. In a wave getting reflected from a denser medium, the additional phase difference introduced is .....

   a) 0 b) $\pi/2$ c) π d) 2π

3. In Fraunhoffer's diffraction with respect to the obstacle .....

   a) both source and screen are at finite distance
   b) both source and screen are effectively at infinity
   c) source is at finite distance and screen is at infinity
   d) screen is at finite distance and source is at infinity

4. Cardinal planes with unit lateral magnification are-----

   (a) principal planes
   (b) focal planes
   (c) nodal planes
   (d) all the above

5. Natural light from any source is ----

   (a) plane polarized (b) elliptically polarized

   (c) circularly polarized (d) unpolarized

Q.2 Attempt any TWO **(20)**

1. Obtain an expression Maxwell's Boltzmann statistics.
2. Obtain an expression Bose Einstein statistic.
3. Obtain an expression for resolving power of telescope and microscope.

Q.3 Attempt any ONE **(5)**

1. Write a note on macrostate and microstate.
2. write a note on position space, momentum space and phase space.

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Autonomous)

Department of Physics

Internal exam (2022-23)

B.Sc.II Sem IV

Date:- 11/04/2023

Attendance Sheet

Roll No.	Name Of The Student	Signature
7701	Bhojkar Sanika Satish	
7702	Chavan Vaishnavi Ganesh	
7703	Chougale Shivani Shrikant	
7704	Ekashinge Sourabh Amar	
7705	Fernandes Riya Inas	
7706	Gavali Shubham Anil	
7707	Gujare Om Parshuram	
7708	Gujare Omkar Parshuram	
7709	Jadhav Prerana Suresh	
7710	Jamadar Karishma Khudbuddin	
7711	Kamble Priyanka Ashok	
7712	Kamble Rutik Viththal	
7713	Karake Sayyam Deshbhushan	
7714	Koli Prajakta Mahesh	
7715	Koruche Pratiksha Dipak	
7716	Morbale Aditya Sanjay	
7717	Mujawar Ammar Mukhtar	
7718	Musale Aditya Santosh	
7719	Patil Shreyas Balwant	
7720	Patil Vaishnavi Gorksha	
7721	Shinde Atharva Dattatray	
7722	Anchi Siddharth Vikas	
7723	Atigre Sarthak Sujit	
7724	Buchade Vivek Vasant	
7725	Chavan Snehal Bhikaji	
7726	Chougule Rohit Anand	
7727	Dangar Noor Sanaulla	
7728	Desai Sejal Anil	
7729	Gadkari Sourav Sharad	
7730	Jadhav Ananya Netaji	
7731	Kumbhar Trupti Arvind	

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ESTD JUNE 1964
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7732	Patil Dipti Dilip	
7733	Patil Sudarshan Rajaram	
7734	Pawar Shubham Sudhir	
7735	Pendhari Samir Bakash	
7736	Pirjade Sahad Maksud	
7737	Shinde Ajit Baban	
7738	Shinde Shivam Firoj	
7739	Swami Yash Anil	
7740	Terani Akshata Sanjay	
7741	Burambale Kartik Nandkumar	
7742	Chavan Aishwarya Sanjay	
7743	Chougale Anuja Anil	
7744	Dhavale Pratik Vijay	
7745	Dongare Rushi Chandrakant	
7746	Gaikwad Sanika Balaso	
7747	Gawade Shweta Sanjay	
7748	Ghatage Shivani Shivaji	
7749	Gudle Pallavi Bhujgonda	
7750	Gurav Reva Sunil	
7751	Jadhav Sandesh Daji	
7752	Karne Dipali Ramesh	
7753	Kashid Namrata Maruti	
7754	Magadum Anuja Balaso	
7755	Mane Siddhi Bipinkumar	
7756	Metkari Sourabh Dadaso	
7757	Mohite Srusthi Pandharinath	
7758	More Shivani Pandurang	
7759	Parit Vaishnavi Sudesh	
7760	Patil Hardik Dilip	
7761	Patil Tejaswini Shahajirao	
7762	Rathi Shreya Sanjay	
7763	Satpute Sakshi Pandurang	
7764	Shinde Neha Rajesh	
7765	Shinde Pallavi Savanta	
7766	Shingare Sanskruti Sanjay	
7767	Singh Sadhana Sanjay	
7768	Vhanmane Shubham Abaso	
7769	Demanna Shreyashree Shantinath	
7770	Hasbe Saad Sanjay	
7771	Khilare Rutik Sunil	
7772	Khot Shrutika Sambhaji	
7773	More Omkar Nandkumar	
7774	Pathan Misam Ashfak	
7775	Patil Dhanshree Madhusudan	
7776	Sutar Sushant Vilas	
7777	Shaikh Adnan Mohammadyasin	
7983	Patil Abhishek Ananda	

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ESTD JUNE 1964
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7984	Desai Pratik Mahesh	PDesai
7990	Khot Ganesh Vitthal	Khot

Internal Examinar.... SSlattle .....

VIVEKANAND COLLEGE KOLHAPUR (Autonomous)
ESTD JUNE 1964

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

– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27640

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Suppliment No. : 18/30

Roll No. : 7714

Class : B.Sc-II, Sem IV

Signature of Supervisor

Subject : Thermal and statistical II

Test / Tutorial No. :

Div. :

Q1.

1. d. all the above

2. ~~b. π/2~~ ~~c. π/2~~ c. π

3. b. both source and screen are effectively at infini

4. a. principle planes

5. d. unpolarised.

VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Autonomous)

Q2

1. Maxwell's Boltzmann statistics

Consider an assembly of N gas molecules whose energies are limited to k values $u_1, u_2, u_3 \cdots u_k$. If there are n_i molecules of energy u_i total energy of assembly is U. most probable distribution of molecules

1. The total number of molecules is constant

$$N = n_1 + n_2 + n_3 + \cdots + n_k = \text{constant}$$

$$\text{or} \quad \delta N = \delta n_1 + \delta n_2 + \delta n_3 + \cdots \delta n_k = 0$$

$$\therefore \quad \Sigma \delta n_i = 0 \quad \text{---} (1)$$

2. The total energy of assembly is constant

n_1 molecules have energy u_1, each n_2 molecules have energy u_2 and so on upto n_k molecules have energy u_k

$$U = u_1 n_1 + u_2 n_2 + \cdots + u_k n_k = \text{constant}$$

$$\text{or} \quad \delta u = u_1 \delta n_1 + u_2 \delta n_2 + \cdots + u_k \delta n_k = 0$$

$$\therefore \quad \Sigma u_i \delta n_i = 0 \quad \text{---} (2)$$

$\therefore$ total probability of particular distribution

$$W = \frac{N_i}{n_1! n_2! \cdots n_k!} (g_1)^{n_1} (g_2)^{n_2} (g_3)^{n_3} \cdots (g_k)^{n_k}$$

for most probable dist^n

$$\delta \ln W = \delta(\ln N! - \Sigma \ln n_i! + \Sigma n_i \ln g_i) = 0$$

It gives

$$-\Sigma \ln n_i \delta n_i + \Sigma \ln g_i \delta n_i = 0 \quad \text{---} (3)$$

∴ Multiply eq^n (1) by $-\alpha$ and eq^n (2) by $-\beta$ adding to eq^n (3)

$$\Sigma(-\ln n_i + \ln g_i - \alpha - \beta u_i)\delta n_i = 0$$

$$\therefore \delta n_i \neq 0$$

$$-\ln n_i + \ln g_i - \alpha - \beta u_i = 0$$

$$\therefore \ln n_i = \ln g_i - \alpha - \beta u_i = \ln g_i + \ln e^{-\alpha} + \ln e^{-\beta u_i}$$

$$= \ln(g_i e^{-\alpha} \cdot e^{-\beta u_i})$$

$$\therefore n_i = g_i e^{-\alpha} e^{-\beta u_i}$$

Q3.

1. Microstate -

A phase point for any molecule may be supposed to lie inside one these cells. To define microstate of assembly the position of phase point for each and every molecule should be specified distinctly

2. Macrostate -

of an assembly of gas molecules can be defined by specifying the no. of phase points in each cell of phase space such as n_1 phase points in cell 1, n_2 phase points in cell 2

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– शिक्षणमहर्षी डॉ. बापूजी साळुंखे

27643

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

19/30

Suppliment No. :

Roll No. : 7721

Class : B.Sc-II, SemIV

Signature of Supervisor

Subject : Thermal and Statistical II

Test / Tutorial No. :

Div. :

Q1.

1. d. all the above

2. b. $\pi/2$

3. b. both source and screen are effectively at infinity

4. a. principle planes

5. d. unpolarised

Q2.

1. Maxwell's Boltzmann Statistics -

Consider an assembly of N gas molecules whose energies are limited to K values $u_1, u_2 \dots u_K$. If there are n_i molecules of energy u_i total energy of assembly is U

Total number of molecules is constant

$$\therefore N = n_1 + n_2 + \dots + n_K = \text{constant}$$

$$\text{OR} \quad \delta N = \delta n_1 + \delta n_2 + \dots + \delta n_K = 0$$

$$\therefore \quad \Sigma \delta n_i = 0 \quad \text{---} (1)$$

2. The total energy of assembly is constant n_1 molecules have energy u_1 and n_2 molecules have energy u_2 and so on upto n_K molecules have energy u_K

$$U = u_1 n_1 + u_2 n_2 + \dots + u_K n_K = \text{constant}$$

$$\text{OR} \quad \delta u = u_1 \delta n_1 + u_2 \delta n_2 \dots + u_K \delta n_K = 0$$

$$\therefore \quad \Sigma u_i \delta n_i = 0$$

total probability of particular dis^n

$$\therefore W = \frac{N_i}{n_1!\, n_2! \dots n_K!} (g_1)^{n_1} (g_2)^{n_2} \dots (g_K)^{n_K}$$

For most Probable distribution

$\therefore \delta \ln W = \delta(\ln N! - \Sigma \ln n_i! + \Sigma n_i \ln g_i) = 0$

It gives,

$-\Sigma \ln n_i \delta n_i + \Sigma \ln g_i \delta n_i = 0$ ——③

∴ Multiphy eqⁿ ① by $-\alpha$ and eqⁿ ② by $-\beta$ adding to eqⁿ ③

$\therefore \Sigma(-\ln n_i + \ln g_i - \alpha - \beta u_i)\delta n_i = 0$

$\therefore \delta n_i \neq 0$

$\therefore -\ln n_i + \ln g_i - \alpha - \beta u_i = 0$

$\therefore \ln n_i = \ln g_i - \alpha - \beta u_i = \ln g_i + \ln e^{-\alpha} + \ln e^{-\beta u_i}$

$= \ln(g_i e^{-\alpha} e^{-\beta u_i})$

$\therefore n_i = g_i e^{-\alpha} e^{-\beta u_i}$

10

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur (Autonomous)

Internal Examination 2022-23

ASTROPHYSICS-DSC -1001D

B.Sc. – II, Sem – III

(Galaxies, Cosmology, solar system & cosmic electrodynamics)

Time: 30 Minutes Marks: 30

Q. 1. Select Correct Alternatives **(5)**

1) A stellar spectrum is an ..... spectra which shows dark lines in the spectra.

a) absorption b) emission c) transmission d) atomic

2) The group of stars with ionised helium lines in the spectra are known as .....stars.

a) O b) F c) K d) M

3) The coolest group of stars among all stars with surface temperature lower than 3500 K are ..... stars.

a) O b) F c) K d) M

4) Nuclei having a constant binding energy per nucleon are relatively ..... nuclei.

a) unstable b) stable

c) low atomic number d) high atomic number

5) A stellar spectra is an ..... spectra which shows dark lines in the spectra.

a) absorption b) emission

c) transmission d) atomic

Short Answer Questions (Attempt any Three) **(15)**

1) Explain the nebular hypothesis of formation of solar system.

2) Write a note on spectral classification of stars

3) Explain nuclear fusion reactions in stars.

4) Write a note on apparent luminosity of stars and magnitude scale.

Long Answer Questions (Attempt any ONE) **(10)**

1) Derive an equation for Equation of continuity (conservation of mass).

2) Derive an equation for Navier-Stokes equation for viscous fluid.

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Autonomous)

Department of Physics

Internal exam (2022-23)

B.Sc.II (Astrophysics) Sem IV

Date:- 10/04/2023

Attendance Sheet

Roll No.	Name Of The Student	Signature
7769	Demanna Shreyashree Shantinath	Demanna.
7770	Hasbe Saad Sanjay	Hasbe
7771	Khilare Rutik Sunil	(RK)
7772	Khot Shrutika Sambhaji	Khot
7773	More Omkar Nandkumar	More
7774	Pathan Misam Ashfak	Pathan.
7775	Patil Dhanshree Madhusudan	Patil
7776	Sutar Sushant Vilas	Sutar.
7777	Shaikh Adnan Mohammadyasin	A Shaikh

Internal Examinar.....

VIVEKANAND KOLHAPUR ESTD JUNE 1964 (Autonomous)

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-शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. : 25

Roll No. : 7484

Class : B.Sc - II

Subject : Astrophysics

Test / Tutorial No. :

Div. :

Q.1)

1) d) their distance from earth

2) c) radio galaxies

3) a) 76 years

4) b) group of stars

5) a) Spiral galaxy

6) a) absorption

7) a) O

8) d) M

9) b) stable

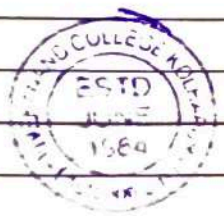
10) b) red old star.

Q 2>

3> Luminosity of Star →

Luminosity is the total amount of electromagnetic theory emitted per unit time by an object. In SI system luminosity is measured in two Joules/second. The luminosity is measured in two forms namely visible light and bolometric luminosity. Generally the term luminosity means bolometric luminosity. The intrinsic brightness of a star is called its absolute luminosity. which depends upon the size and temp of the star. temp of the star is equivalent to that of a black body reporducing the same power. The aperent luminosity is the observed luminosity which depends upon its absolute luminosity & distance from the observer.

The luminosity of a celestial body is indicated in terms of magnitude. The concept of magnitude was first introduced by greet astronomer Hipparchus in 2nd century BC. It was assumed that all stars are moving on the surface of celestial sphere having radius of 20,000 Re. Initially the stars were grouped into 6 distrete categories depending upon their apparent brightness. The first magnitude stars are twice as bright as the next magnitude stars. The second was twice as third and so on. down to the faintest stars. (6th magnitude).



Q.2)

1) Measurement of brightness of a star is relative because one can compare the luminocities of two stars or luminosity of a star with an artificial standard source of light. Apart from visual method, the photographic and photoelectric method are used for luminosity measurement.

* Photographic method →

This method is used after 1840 AD and uses the principle of photography. ie. when a photographic plate is exposed to light and developed the intensity of light is reflected on the photograph. When equal exposure time & identical conditions of photographic plate development is carried then stars of equal luminosities produce an image of equal diameter. The optical image of a star is very small but due to scattering of photons through photographic imulsion produce image of considerable size the size of image proportional to luminosity of a star.

Initially with a single starlight the photographic plates are exposed of different times like 5, 10, 20, 40, 80 seconds. etc. & images are developed. The nature of images are shown.

Now the light from the star whose luminosity is to be measured is focused on the photographic plates for known exposure time & image is developed.

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Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. : (19)

Roll No. : 7487

Class : B.Sc II

Subject : Astrophysics

Test / Tutorial No. : Internal exam

Div. :

Q.1

1) d) Their distance from earth

2) c) radio galaxies

3) a) 76 years

4) b) group of stars

5) a) spiral galaxy

6) a) absorption

7) a) O

8) d) F9

9) b) stable

10) b) red old star

VIVEKANAND COLLEGE KOLHAPUR ESTD JUNE 1964 (Autonomous)

Q. 2

12 Measurement of brightness of a star is relative because one can compare the luminocities of two stars or luminosity of a star with an artificial standard source of light. Apart from visual method, the photographic and photoelectric method are used for luminosity measurement.

* Photographic method *

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Now the light from the star whose luminosity is to be measured is focused on the photographic plates for known exposure time & image is developed.

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-शिक्षणमहर्षी डॉ. बापूजी साळुंखे

Shri Swami Vivekanand Shikshan Sanstha Kolhapur's

VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)

SUPPLIMENT

Signature of Supervisor	

Suppliment No. : (17) / 25

Roll No. : 7491

Class : B.Sc- II

Subject : Astrophysics

Test / Tutorial No. :

Div. :

Q1.

1. d) their distance From earth
2. c) radio galaxies
3. a) 76 years
4. b) group of stars
5. a) Spiral galaxy
6. a) absorption
7. a) 0
8. d) H
9. b) stable
10. b) red old star

Q 2.

3. Luminosity of Star -

Luminosity is the total amount of electromagnetic theory emitted per unit time by an object. In SI system luminosity is measured in Joules/second. The luminosity is measured in two forms namely visible light and bolometric luminosity.

Generally the term luminosity means bolometric luminosity. The intrinsic brightness of star is called absolute luminosity. which depends upon the size and temp of the star. temp of star is equivalent to that of black body reproducing the same power. The apparent luminosity is the observed luminosity which depend upon its absolute luminosity and distance from observer.

The luminosity of celestial body is indicated in terms of magnitude. The concept of magnitude was first introduced by greek astronomer Hippachrus in 2nd Century BC. It was assumed that all stars are moving on surface of celestial sphere having radius of 20,000 Re. Initially the stars were grouped into 6 distrete categories depend upon their apparent brightness. The first magnitude stars are twice as bright as the the next magnitude stars.