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,	11.00 to	B.Sc. – II	Paper – III	Galaxies
10/04/2023	12.00 AM	(Astrophysics)	Paper – IV	Fluids
Tuesday,	10.00 to	B.Sc. – I	Physics Paper - III	Network Theorem
11/04/2023	11.00 AM		Physics Paper – IV	Vector Algebra
Tuesday, 10.00 to 11/04/2023 11.00 AM	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)		301 (03 rd Floor)	7201 to 7252
2)		312 (03 rd Floor)	7253 to 7285
3)		313 (03 rd Floor)	7286 to 7318
4)	B.ScI	314 (03 rd Floor)	7319 to 7352
5)		315 (03 rd Floor)	7353 to 7390
6)		319 (03 rd 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)		BCS Lecture Hall (04th Floor)	7701 to 7740
10)	B.Sc. – II	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



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

Q. 1. Select Correct Alternatives

Marks: 30

(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 dens	ser 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(c) circularly polarized

(b) elliptically polarized(d) unpolarized

Q.2 Attempt any TWO

(20)

(5)

- 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

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



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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	Sanika.
7702	Chavan Vaishnavi Ganesh	Thaven
7703	Chougale Shivani Shrikant	Anidand.
7704	Ekashinge Sourabh Amar	35
7705	Fernandes Riya Inas	RE
7706	Gavali Shubham Anil	Lanali
7707	Gujare Om Parshuram	cm.
7708	Gujare Omkar Parshuram	Quere
7709	Jadhav Prerana Suresh	Trather
7710	Jamadar Karishma Khudbuddin	-KF.
7711	Kamble Priyanka Ashok	Printanka
7712	Kamble Rutik Viththal	Reunible
7713	Karake Sayyam Deshbhushan	Saman .
7714	Koli Prajakta Mahesh	Kali
7715	Koruche Pratiksha Dipak	POK
7716	Morbale Aditya Sanjay	Mochall
7717	Mujawar Ammar Mukhtar	Anjavas.
7718	Musale Aditya Santosh	Misala_
7719	Patil Shreyas Balwant	Statil
7720	Patil Vaishnavi Gorksha	Maple.
7721	Shinde Atharva Dattatray	Alpindu
7722	Anchi Siddharth Vikas	Biddhaeth
7723	Atigre Sarthak Sujit	Southan.
7724	Buchade Vivek Vasant	Ruchdal
7725	Chavan Snehal Bhikaji	Sharren.
7726	Chougule Rohit Anand	Rohit
7727	Dangar Noor Sanaulla	·Nongae
7728	Desai Sejal Anil	Erca ,
7729	Gadkari Sourav Sharad	Sakant
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7731	Kumbhar Trupti Arvind	Tando



7732	Patil Dipti Dilip	Matil
7733	Patil Sudarshan Rajaram	retit
7734	Pawar Shubham Sudhir	AP.
7735	Pendhari Samir Bakash	lamie.
7736	Pirjade Sahad Maksud	Anode
7737	Shinde Ajit Baban	ALE
7738	Shinde Shivam Firoj	Ainde
7739	Swami Yash Anil	Swamp
7740	Terani Akshata Sanjay	Aeroni.
7741	Burambale Kartik Nandkumar	Kostik
7742	Chavan Aishwarya Sanjay	Ahavan
7743	Chougale Anuja Anil	Achavag
7744	Dhavale Pratik Vijay	Fratik
7745	Dongare Rushi Chandrakant	R. a.Dongoor
7746	Gaikwad Sanika Balaso	Epaik Wad.
7747	Gawade Shweta Sanjay	Shewebal
7748	Ghatage Shivani Shivaji	Ghatage
7749	Gudle Pallavi Bhujgonda	Sus chatere
7750	Gurav Reva Sunil	CAT.
7751	Jadhav Sandesh Daji	Fidhav
7752	Karne Dipali Ramesh	ROEN.
7753	Kashid Namrata Maruti	-NK-
7754	Magadum Anuja Balaso	Magdum.
7755	Mane Siddhi Bipinkumar	odd hu
7756	Metkari Sourabh Dadaso	
7757	Mohite Srusthi Pandharinath	pachite.
7758	More Shivani Pandurang	Sharani
7759	Parit Vaishnavi Sudesh	Votut.
7760	Patil Hardik Dilip	Hapes.
7761	Patil Tejaswini Shahajirao	Fatil
7762	Rathi Shreya Sanjay	Pathe
7763	Satpute Sakshi Pandurang	deathe
7764	Shinde Neha Rajesh	Ateha
7765	Shinde Pallavi Savanta	Bhinde
7766	Shingare Sanskruti Sanjay	Shingerice
7767	Singh Sadhana Sanjay	Soneth.
7768	Vhanmane Shubham Abaso	JEA_
7769	Demanna Shreyashree Shantinath	Tonain
7770	Hasbe Saad Sanjay	dame.
7771	Khilare Rutik Sunil	Rhilare
7772	Khot Shrutika Sambhaji	Sthat.
7773	More Omkar Nandkumar	Unka
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7984	Desai Pratik Mahesh	Plesal
7990	Khot Ganesh Vitthal	Ckhat

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_	Shri Swami Vivekanand S	Shikshan Sanstha Kolha	pur's	
V	IVEKANAND COLLEGE, H	KOLHAPUR (AUTONOMOL	JS)
	SUPPLIMENT	Signature of Supervisor	•	
Su	ppliment No. : 30	Subject : Thermal	and statistical	
Ro	11 No. : 7714	Test / Tutorial No. :		
Cla	ss : B.Sc-Ⅱ, SemIV	Div. :	1	
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62 Plaxwell's Boltzmann Statistics |. Consider an assembly of N gas molecules whose energies are limited to k values U, 4243---Us. If there are ni molecules of energy ui total energy of assembly is V. most probable distribution of molecules 1. The total number of molecules is constant $N = n_1 + n_2 + n_3 + \dots + n_K = (onstant)$ $\sigma \in \delta M = \delta n_1 + \delta n_2 + \delta n_3 + \dots + \delta n_k = 0$ $z \delta n_i = 0 - 0$ 2. The total energy of assembly is constant A molecules have energy u, each no molecules have energy up and so on up to nx molecules have energy lik U = UINI + ULN2 + ---- + UKNK = CONSTANT OE du = 4, dn, + 428n2 + --- + UKONK = 0 :. < uidni = 0 -2 i itotal probability of particular distribution $M = N^{\circ}$ $N_{1}^{\circ} (9)^{n_{1}} (92)^{n_{2}} (93)^{n_{3}} - (9k)^{n_{k}}$ $N_{1}^{\circ} (92)^{n_{2}} (93)^{n_{3}} - (9k)^{n_{k}}$

for most probable dis $\delta \ln W = \delta (\ln N! - \Sigma \ln n; 1 + \Sigma n; \ln g;) = 0$.It gives :-- z la nidnit z lagi dai = 6 3 adding to eqn 3. - of and eqn 2 by -B z(-lnni+lngi-α-βui)dni=0 : Sn; to Kaning 16 -In n; + Ingi-q-Bui=0 : In ni = Ingi - ~ - Bui = Ingi + Ine + Ine Bu =ln(gie.e) \therefore $n_i = g_i^2 e^2 e$ 10

Q3. Plicostate 1. A phase point for any molecule may be supported to die inside one these cells. To define microspate of assembly the position of phase point for each and every molecule should be specified distinctly Macmostate. 2. defined by Specifying the no of phase points in each cell of phase space such as n, phase Can be cell points in cell + no phase points in

।। ज्ञान, विज्ञान आणि सुसस्क	भर यासाठी शिक्षण प्रसार ।।
Shri Swami Vivekanand S	– शिक्षणमहथी डॉ. बापूजी साळुखे Shikshan Sanstha Kolhapur's
VIVEKANAND COLLEGE, F	KOLHAPUR (AUTONOMOUS)
SUPPLIMENT Suppliment No. : Roll No. : 7721 Class : B.ScII, SemII	Signature of Supervisor Subject : Thermal and Statistical II Test / Tutorial No. : Div. :
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a. all the above	
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3. b. both source and so	creen at e effectively at infinity
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Q2. Maxwell's Boltzmann Statistics -Consider an assembly of N gas molecules whose energies are limited to k values u, ue---Uk IF there are ni molecules of energy u; total encogy 1of assembly is U Total number of molecules is constant $\therefore N = n_1 + n_2 + - - + n_k = Constant$ 02 SN = Sn, + Sn2 + --- + Snk = 0 : Zôn: =0 -0 2. The total energy of assembly is constant n. molecules have energy u, and N2 molecules have energy u2 and so on upto nk molecules have encrogy uk U = UINI + UENE + - - + UKNK = Constant 02 SU = 4, 8n, + 428n2 - - + 4K8nK = :. Z Uidni = 0 total probability of particular dism $\frac{N_{1}}{n_{1}!} \frac{(g_{1})^{n_{1}}(g_{2})^{n_{2}}}{(g_{1})^{n_{1}}(g_{2})^{n_{2}}} - - (g_{k})^{n_{k}}$

for most Probable distribution $\therefore \delta \ln W = \delta (\ln N! - \Sigma \ln n! + \Sigma n! \ln g!) = 0$ It gives, - Elnnigni + Elngigni = 0 - 3 adding to eqn 3 and eqn 2 by -B : E(- Inni + Ingi-q- Bui) Sni=0 :. Sni = 0 $\therefore - \ln n_i + \ln g_i - q - \beta u_i = 0$:. Un ni = Ungi - q - Bui = Ungi + Ine^q + Ine = Incgie^{-a}, e \therefore $n_i = g_i e^{-\alpha} e^{-\beta u_i}$ D

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

(5)

Marks: 30

Q. 1. Select Correct Alternatives

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 asstars.

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

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)

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)

(15)

- 1) Derive an equation for Equation of continuity (conservation of mass).
- 2) Derive an equation for Navier-Stokes equation for viscous fluid



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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	fornanna.
7770	Hasbe Saad Sanjay	facabe
7771	Khilare Rutik Sunil	(PP)
7772	Khot Shrutika Sambhaji	shot
7773	More Omkar Nandkumar	Mare
7774	Pathan Misam Ashfak	Felthan.
7775	Patil Dhanshree Madhusudan	fatti
7776	Sutar Sushant Vilas	Soular.
7777	Shaikh Adnan Mohammadyasin	Abaikh

Internal Examinar



'' ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार '' -शिक्षणमहर्षी डॉ. बापूजी साखुंखे Shri Swami Vivekanand Shikshan Sanstha Kolhapur's VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS)		
SUPPLIMENT	Signature of Supervisor	
Suppliment No. :	Subject : Astrophysics	
Roll No. : 7484	Test / Tutorial No. :	
Class : BSc-II	Div. :	
Q.17		
d) their distance from e	earth	
25 cs radio galaxies	and L	
31 a) 76 years	early of the liter	
4× b> group of stars		
55 as Spiral galaxy		
6) as absorption		
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9× b) stable		
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Q2> 3> Luminosity of Star > Luminosity is the total amount of electromagnetic - Theory emitted per unit time by an abject. In SI system luminosity is measured in two Joules/ second. The luminosity is macured in two forms mamely visible light and balametric Juminosity. Generally the term Juminosity means belometric 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 of distance from the observer The luminosity of a celestial body is indeated in terms of magnitude. The concept of magnitude was first introduced by greet astronomer Hippachian in 2nd century BC. It was assumed that all stars are moving on the surface. If 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. (6 th magnitude).

(1,2)	
1)	Manuscoment of brightness of a star is velative
V	because the course and a during sitile of two
	stars of huminosity of the number of cities
	Similar a star with a star with an allisted
·	standard source at light. Apart from once
	method, the photographic and photoclears in cinca
	are used for luminosity measurement
	X Distance II II
	Frotographic method -)
	This method is used at tes is to me and
	uses the prociple of photography i.e. when a
	photographic plate is exposed to light dis
	devictoped the intensity of light is actiected on
	the photograph when equal exposure time of
	Identical conditions of photographic plate develop
1	prent is carried then stars of equal luminosite
2	produce an image of equal diameter. The
	poptical image of a star is very small but are
	to scattering of photons. through photographic
-	Imusion produce incige of considerable size the
10	size a image proportional to luminosity at a
1	STOR.
1	Initially with a single starlight the
	photographic plates are exposed of different
	times like 5, 10, 20, 40, 80 seconds. etc. g
	images are developed. The hature of images are
. /	shown.
	Now The right from the star whose
	Tuminosity is to be measured is focused on
	The protographic plates for known exposure
	time 9 image is developed.
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	SUPPLIMENT	Signature of Supervisor	
Supplim	nent No. :	Subject : Astrophysics	
Roll No.	: 7487	Test/Tutorial No.: Internal exam	
Class	: B.Sc I	Div. :	
2.1		2 - S. 19	
1)	d) Their distance from	earth	
25	c) radio galaxies		
3)	a)76 years		
5)	b) group of stars		
5)	a) spiral galaxy	in the second	
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7)	a) o		
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		T. (1964 5)	

Q. 2 Measurement of brightness of a star is relative because one can compare the luminocities of 12 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 i.e when a photographic plate is exposed to light and developed the intensity of light is photod developed the intensity of light is reflected on the photograph when equal exposure time 4 identical conditions of photographic plate develop-ment is carried then stars of equal luminosities produce an image of equal digmete. 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 03 and 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.

SUPPLIMENT			Signature of Supervisor		10110007
Suppliment No. :		Subject :	Subject : Astrophysics Test/Tutorial No. :		
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3.	Luminosity of State- Luminosity is the total amount of clectromagnetic theory emitted per unit time by an object. In st system luminosity is measured in Toules/second. The luminosity is measured in two forms namely visible dight. and bolometric luminosity Generally the term luminosity means bolometric luminosity. The intrinsic brightness of State is called absolute -luminosity. which depends upon the Size and temp of the State temp of store is equivalent to that or black body meproducing the Same power The apement luminosity is the observed luminosity which depend upon its absolute luminosity and distance from Observet
	The luminosity of celestial body is indicated in terms of magnitude. The concept of magnitude was first introduced by greet astronomer Hippachous in 2nd century BC. It was assumed that all stots gree moving on surface of celestical Sphere havin radius of 20,000 Re. Initially the Stors were prouped into 6 distrete categories depend upon their apparent mightness. The first magnitude stors are twice gs bright as the the next magnitude Stors.
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