# Vivekanand College, Kolhapur. (Autonomous) Department of Physics Internal Examination Notice 2019-20

Date: 15/01/2020

All students of class B.Sc. I, B.Sc. II and B.Sc. III are hereby noticed that the second term internal evaluation examination is scheduled as per following time table. Nature of question paper:

For B.Sc. I: Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks

For B.Sc. II : Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks

**For B.Sc. II** (Astro) : Long answer question (Any one from given two questions) for 10 marks Short answer question (Any two from given three questions) for 10 marks

For B.Sc. III: Long answer question (Any one from given two questions) for 10 marks

Short answer question (Any two from given three questions) for 10 marks Internal Evaluation Examination 2019-20. SEM II, SEM IV and SEM VI Time Table

Sr. No.	Class	Paper	Date	Time
1.	B.Sc. I	Paper II	27/01/2020	11:00 am to 12:00 pm
2	B.Sc. II	Paper IV	27/01/2020	11:00 am to 12:00 pm
3	B.Sc. II (Astrophysics)	Paper II	28/01/2020	11:00 am to 12:00 pm
4	B Sc. III	Paper VII (section I)	29/01/2020	11:00 am to 12:00 pm
		Paper VII (section II)	_	01:00 am to 02:00 pm
		Paper VIII (section I)	30/01/2020	11:00 am to 12:00 pm
		Paper VIII (section II)	-	01:00 am to 02:00 pm



Vivekanand College, Kolhapur

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"Education for Knowledge, Science and Culture" -Shikshanmaharshi Dr. Bapuji Salunkhe				
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur				
Vivekanand College, Kolhapur (Autonomous) B. Sc. Part-II (Semester- IV)				
Internal Examination				
Subject: Physics Paper IV				
Title of the Paper: THERMAL PHYSICS AND STATISTICAL MECHANIC	S – 11			
& WAVES AND OPTICS-II				
Paper Code: DSC-1001D				
Day and Date: 15/02/2020 Total I	Marks: 20			
Time: 2.30pm to 3.30 pm				
Instructions: 1) All questions are compulsory.				
<ol><li>Figures to the right indicate full marks.</li></ol>				
<ol><li>Use of Scientific calculator or Log table is allowed.</li></ol>				
<ol><li>Draw the neat labeled diagram whenever necessary</li></ol>				
Q.1) Attempt any one	(10)			
i) With neat labeled diagram, obtain Newton's formula.				
ii) Derive Plank's law of radiation.				
Q.2) Attempt any two	(10)			
i) Write a note on principle plane.				
ii) Show that angular magnification is $\gamma m$ is equal to one.				
iii) Obtain the relation for thermodynamic potential.				
iv) Describe phase space in details.				

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

Shri Swami Vivekanand Shikshan Sanstha's

# Vivekanand College, Kolhapur

#### (Autonomous)

# **Department of Physics**

## Internal exam

## B.Sc.II Sem IV

### Date:- 27/01/2020

## Attendance Sheet

Roll No.	Name Of The Student	Signature
7550	Bachche Aomkar Prakash	A.
7551	Banasavade Omkar Devadas	Banakar.
7552	Bhatale Sachin Sakharam	Birdale
7553	Gole Gaurav Rajaram	eng
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7556	Khandekar Pooja Sanjay	Read-
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7562	Padaval Vaibhav Sadashiv	Vadual.
7563	Parab Vinayak Sumant	Vparab
7564	Patil Aakansha Bhimarao	Actil
7565	Patil Akshay Dhanaji	ADRild.
7566	Patil Aniket Ananda	Attu
7567	Patil Anuja Dattajirao	Aaty
7568	Patil Prajkta Krushnat	Hatt
7569	Patil Shivani Vishnu	Tatu
7570	Pawar Aakash Anandrao	Aquar
7571	Pirai Omkar Baban	Clopm.
7572	Rane Rohit Ramdas	Kane
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7575	Sayyad Alsaba Javed	Ababa
7576	Shelar Avinash Sanjay	Ethelar.
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7692	Chokakkar Viraj Vijay	Vchokakka
7693	Chougale Tejaswini Bajirao	Fougule
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Internal Examinar. Dr. Trupti U. Vounkar



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Shri Swami Vivekanand	Shikshan Sanstha Kolhapur's			
VIVEKANAND COLLEGE, I	KOLHAPUR (AUTONOMOUS)			
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@ I enic bend: - I to formation takes place when one or more electron from the when one or molecule is shored to the atom of one molecule is shored to the otem of another molecule salled as an ionic bond tence ionic bond is strong in entire (i) (avalent bond :- Heat is required in order to supply enternal every for the bond transfer to take place. In constant band, the atoms are shared in between two atoms of two noteules. en: - Nat and chi ion form Nall molecule which is complex in nature (iii) Van der Wools bond: The bond which is borned in lectureen two atoms of two molecules using that der Wool's borres are colled as Van der Waals bond. These Van der Wools forces nay be strong or weak. These forces of attraction depend on the heat supplied. (iv) Nobord :- When sometimes during a reaction, the ion enchange does not take place. So these is sometimes no bond formation in between the two atom of the two molecules Heave in Of such situations, no bond is formed So sometimes no band is formed during ion enthange in the ESTD the atoms

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VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS) SUPPLIMENT Suppliment No.: Roll No. : 7051 Class : B.sc. II Subject: Physics Test Tutorial No.: Internal 24/30 Div: A Subject: Physics Test Tutorial No.: Internal 24/30 Div: A Subject: Physics Test Present Diackbody coefficient of absorption is One Suppliming equation represent wein displacement law where notations have their usual meaning AnT = constant. Subject: Subject: Subject Diackbody coefficient of absorption is One Subject: Physics The energy of plank's oscillator is mhy - The blackbody radiation spectrum is shorts coavelength region Can be verified by wein's distribution law. The energy radiated per second per unit area by perfect blackbody at temperature T is proportional to. The subjects weine the subject of the second per unit area by perfect Subject: Subject: Subject to the second per unit area by perfect Subject: Subject at temperature T is proportional to. The subject of the second per unit area by perfect to the second per unit area	\$	।। ज्ञान, विज्ञान आणि सुसं Shri Swami Vivekanand	iस्कार यांसाठी शिक्षण प्रसार ।। – शिक्षणमहर्षी डॉ. बापूजी साळुंखे 27068 d Shikshan Sanstha Kolhapur's
SUPPLIMENT Suppliment No.: Suppliment No.: Roll No. : 7051 Class : B.sc. II Subject: Physics Test / Tutorial No.: Internal 24/30 Div.: A		VIVEKANAND COLLEGE,	KOLHAPUR (AUTONOMOUS)
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→ For perfect blackbody coefficient of absorption is <u>One</u> © 2 → Following equation represents wein displacement law where notations have their usual meaning <u>Am T = constant</u> . @ 3 → The energy of plank!s oscillator is <u>mh?</u> . @ 4 → The blackbody radiation spectrum is <u>shorter</u> wavelength region can be verified by <u>wein's distrubution law</u> . @ 5 → The energy radiated per second per unit area by perfect blackbody at temperature T is proportional to <u>T</u> <sup>4</sup> <u>Super</u>	-01	1 1 1	Committee Parts
<ul> <li>Following equation represents wein displacement law where notations have their usual meaning <u>AmT = constant</u>.</li> <li>a.3</li> <li>The energy of plank's oscillator is <u>mh?</u>.</li> <li>The blackbody radiation spectrum is shorter wavelength region can be verified by wein's shorter wavelength region can be verified by wein's shorter blackbody radiated per second per unit area by perfect blackbody at temperature. T is proportional to. The spectrum is proportional to the spectrum is proper is proportional to the</li></ul>		For perfect blackbody c	pefficient of absorption is <u>One</u>
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Can be verified by wein's distrubution law. ∞s → The energy radiated pes second pes unit area by perfect black body at temperature T is proportional to. T <sup>4</sup> Start Sources JUNE 1964 5	$\rightarrow$	The blackbody radiation	spectrum in shorter wavelength region
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2.6 Newton's rings are localized fringer.  $\rightarrow$ -07 The fringer obtained in wedge shaped thin film are of increasing  $\rightarrow$ thickness 8.00 The center of Newton's rings due to reflected light is -> datk 2.9 Two sources are said to be cohesent if they have constant -> phase difference. Tan school S 14. 1 AS A and the same of the 0.0 - Section 1 In Lloyd's single minor experiment, the central fringe is ) observed to be dark mount Ľ. Zidanla to ¢

0-2 T the take a specieal radiation We take a sphesical enclosure in which the blackbody radiations are taken. Now we have plank's law of radiation in frequency 7 and 7+d7.  $E_{\gamma} d \gamma = \frac{8\pi h \gamma^3}{(e^{h\gamma l k T} - l) c^3} d \gamma$ 1 This energy density per unit area per unit time. This is Energy density for respective region for whole area enclosure we have to integrate eq. ().  $E = \int_{0}^{\infty} E \overline{3} d\overline{3}$  $E = \int_{0}^{\infty} \frac{8 \pi h^{2}}{(e^{h\gamma IKT} - 1)c^{3}} d\gamma$ <u>-8πh</u> <u>93</u> C3 (ehr/k7-) E - 93 Now take hi = 2 KT = 2  $\gamma = \frac{kT}{k} \mathbf{x}$ 0 00 x  $\infty$ 0  $d\vartheta = \frac{k\Gamma}{k} dx$ Putting all these value.  $\not = \frac{8\pi h}{\epsilon_3} \int_{eh}^{\infty} \frac{(kT\chi_3)}{h\chi_1} \frac{(kT\chi_3)}{h\chi_1}$  $E = \frac{8\pi h}{c_3} \int \frac{\left(\frac{kT}{h}\chi\right)^3}{\left(e^{\chi}-1\right)} d\chi \cdot \frac{kT}{h}$ 

<u>k471</u> x3 <u>h4</u> dx  $= \frac{8\pi h}{c3}$ E  $= \frac{8\pi k^{4} T^{4}}{c^{3} h^{3}} \int_{e^{2} e^{2} - 1}^{e^{2} 2^{3}} dx$ We know the direct integral of jor 23 dr  $E = \frac{8 \pi k_{4+4}}{c_{3+3}} \cdot \frac{\pi 4}{r_{5}}$ = 8175 K474 E 15c3 h3 = AT4 E where A = 8TTS K4 = constant 15 c3 h3 · E X T4 The Ecne Energy of the blackbody per unit area per second is directly proportional to Fourth power absolute temperature. Now In case the blackbody have small hole in it Then the blackbody act as perfect blackbody. The radiations coming out of the hole lopening iper unit area per second is directly proposition to Energy. EXE  $E' = A^{\dagger}E$  $A^{\dagger} = constant = \frac{1}{4}c$ 

	Shri Swami Vivekan	- शिक्षणमहर्षी डॉ. बापूजी साळुंखे 27126 nand Shikshan Sanstha Kolhapur's
VIVEKA	INAND COLLEGI	E, KOLHAPUR (AUTONOMOUS)
S	UPPLIMENT	Signature of Supervisor
Suppliment No.	: 2	Subject: Physics
Roll No.	: 7751	Test / Tutorial No. : Internal
Class	B.SC.	Div.: A
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The second of the second secon The center of newton's rings due to reflect 8) light is dark 3) Too sources are said to be coherent it 44 have all of above L'byd's single missos experiment, the co 10) In. reinde is observed be. daek 40 12.23 HOBLE HELLER . 2 \_\_\_1 Same and a second 11 Cataline 10, 1.5 ARI-1 July March Tala relay - siene - - - -1. . . -september a have ---2. W. M. C. Treal la , versana' cule - star · KEBMAN I An in the article . Hood stands gode 6 F 312 - 512 -Aug-Cal and a - 5 11-24-11 ter I have to 001 2-13-16 5 3 - 1 - r and the Versonary! -1 30 the s and the second Sec. 16. 3 25.9 9,16-73 in a 753 1 to product of sport and COLLEGE TO LAND Station . 1 hin intel -0.5

tetan's law from plank's law. modes of vibertion: the titt is defined as the total energy per unit No. of moles of vibration 's colled modes of vibecitions. ē EN NI = NO e-elky N2 = No e2E/KT  $\left( \left( 1 \rightarrow k \wedge \cdots \right)_{i=1}^{k} \right) \rightarrow 0$ N3 = No e-selkt  $N = N_1 + N_2 + N_3$ = No (1+ e-erki) + e-2erki) +....  $N = N_0$  C(1-Y)  $Pu+(y = e^{-E(KT)})$ and a phone 11.1  $N = N_0$  $CI - e^{-E/ET}$ VK J 1-11/1 E = (ENO e-E/KT + 2E NO E2E/KT + ....)  $E = GN_0 \left( e^{-G/kT} + 2 N_0 e^{-2G/kT} + ... \right)$ = GN\_0 e^{-G/kT} (1 + 2 e^{-G/kT} + ... ) Put etelkt = y = ENO 4 (1+24+342+...) = ENO Y (1-4)2 = EN0 4 (1-4)2

E = ENo e-E/KT) (1- e-E1ka)2  $E = E = E M_0 e^{-\epsilon/\kappa_1}$ N  $(1 - e^{-\epsilon/\kappa_1})^{\tau}$ x (1- estri) No ...  $\frac{e}{1-e^{-e/k\eta}}$ e E/KI) ē E  $\epsilon$ E EKT (1- e-EIKT) E 12 (eelMT)-1 G :hr ehr/kt -1 174 -1 1 de Evdy = Average energy × No. of moles of viba Pez unit volume LY Chr/KT -1 Erdr x 81782 d8 atri 8 TT h83 5 d8 millionali si C3 OHV/KT-1 Eadal CAS (ehclakt -1) = da is the Stepan's law from plank's law. SUCLASH DAV 20 ESTD JUNE 1964 ( ··· - · ) ··· 5/43 -1

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Aishwarya Sanjay chavan. ।। ज्ञान, विज्ञान आणि सुसंस्कार यांसाठी शिक्षण प्रसार ।। 27073 - शिक्षणमहर्षी डॉ. बापूजी साळुंखे Shri Swami Vivekanand Shikshan Sanstha Kolhapur's VIVEKANAND COLLEGE, KOLHAPUR (AUTONOMOUS) Signature SUPPLIMENT of tradition to a day Supervisor Subject: Physics Suppliment No. : 01 Test / Tutorial No. : Infernal Exam : 7042 Roll No. 22/30 : B.SC IL Div. : A Class Q.1) 1) For perfect black body coefficient of absorption is TIZENO 2) Following equation represents wien's displacement law where notations have their usual meaning it AmT = constant the energy of plank's oscillator is iv) nhu 3) The black body radiation spectrum in shorter wavelength 4) region can be verified by III) wien's distribution law @ 5) The energy rodiated per second per unit area by perfect black body at temperature T is proportional j) T4

Newton's rings are i) localized fringes 6) 7) The fringes obtained in wedge shaped thin film are of Dincreasing thickness 8) the center of Newton's rings due to reflected light is i) dark 9) Two Sources are said to be coherent if They have iii) Constant phase difference. 10) In Lloyd's single mimor experiment, the central fringe is observed to be ii) dark. stefan's Law from plank's law 2) we have planks law of radiation in Term EAda - - STThe da AS (ehc/AKT-1

Rayleigh - Jean's Low from planks law. We have planks law of radiation in term  $E\lambda d\lambda = -8 \pi h c d\lambda$  $\lambda^{s}(e^{hc/\lambda kT} - t)$ Rayleigh - Jean's law is aplicable for on large Wavelength The term nc is tvery small. AKT Hence A is very very large. We can write - STTAC dà AS(enc/AKT) EAdd = we con write enclakt = 1 + hC AKT AKT enc EAdd - - STTH/C dd Ng (enclarer) bic

- 817KTDA -8TThe ENdd Above eqn is Rayleigh-Jean law from plank's Law -817 KT d J 24 ELdh = Wien's distribution law from plank's Law 9.3) We have planks law of radiation in term EADA = - STTAC dA AS (PACIAKT-1) wien's distribution is aplicable for only short Waveleng For short Wavelength The termenc/AKT is large as compare to I Hence we can write it is a file enclakt\_1 v enclakt egn () becomes . !! EADA - - STINC dA (NIL) Eldl = - STThc/dl ls (ehc/AKT) : Above equation representes wens distribution law From plank's Law. JUNE

।। ज्ञान, विज्ञान आणि सुसं	स्कार यांसाठी शिक्षण प्रसार ।। – शिक्षणमहर्षी डॉ. बापूजी साळुंखें 27143
Shri Swami Vivekanand	d Shikshan Sanstha Kolhapur's
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Shri Swami Vivekanand Shikshan Sanstha's

#### Vivekanand College, Kolhapur (Autonomous)

### **Internal Examination 2019-20**

B.Sc. II, Sem IV

Astrophysics

(Celestial Mechanics and Introductory Quantum Mecha	anics)
Time: 30 Minutes	Marks: 20
Q.1] Long answer question (Attempt any one of the following)	(10)
1)Derive the expression for Equation of continuity in three dimensions	
2) Derive equation of motion of on ideal fluid.	
Q.2) short answer question (Attempt any TWO of the following)	(10)
1) What is Galaxy? What are the types of galaxies	
2) Write a note on Seyfert Galaxy.	
3)Write a note on Comet.	

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

Shri Swami Vivekanand Shikshan Sanstha's

# Vivekanand College, Kolhapur

#### (Autonomous)

## **Department of Physics**

## Internal exam

## B.Sc.II (Astrophysics) Sem IV

#### Date:- 28/01/2020

## Attendance Sheet

Roll No.	Name Of The Student	Signature
7550	Bachche Aomkar Prakash	(B)
7551	Banasavade Omkar Devadas	Binkoe
7552	Bhatale Sachin Sakharam	Etxotelle
7553	Gole Gaurav Rajaram	filleg
7554	Gurav Rutuja Ravindra	Guzar
7556	Khandekar Pooja Sanjay	fornja
7557	Khatangale Shubhangi Prakash	Epilangle
7558	Khatkale Prashant Prakash	(FD)
7559	Kudalkar Prajakta Shivaji	Philalkat
7560	Mali Rohit Maruti	Alati
7561	More Shubham Laxman	Som
7562	Padaval Vaibhav Sadashiv	Gadare.
7563	Parab Vinayak Sumant	Sparrals
7564	Patil Aakansha Bhimarao	ABalis
7565	Patil Akshay Dhanaji	Arishau
7566	Patil Aniket Ananda	ARK .
7567	Patil Anuja Dattajirao	Apatil
7568	Patil Prajkta Krushnat	Flate
7569	Patil Shivani Vishnu	- All
7570	Pawar Aakash Anandrao	Akash
7571	Pirai Omkar Baban	Riani
7572	Rane Rohit Ramdas	Brace
7573	Salokhe Atish Pundlik	Adob
7574	Satbige Shivanand Sanjeev	Saltig
7575	Sayyad Alsaba Javed	Ababa
7576	Shelar Avinash Sanjay	Endar.
7852	Bedagkar Gauri Rahul	quist
7853	Chavan Ramchandra Ashok	Adaian.
7854	Dayama Abhishek Ashok	Agama
7855	Hiremath Seema Sharanayya	Secone
7856	Jadhav Nikhil Sandeep	\$ jadhav



7857	Kalgutkar Aakash Rajendra	Acaita
7858	Kore Jyoti Vinayak	Stare.
7859	Mane Malhar Uday	MUMane
7860	Patil Omkar Dhanaji	Pril
7861	Patil Omkar Janaba	C.J.
7862	Sarnaik Kunal-Ketan	Sarmik.
7863	Shaikh Soufeen Shahmahmad	SS.
7864	Shetke Pushkraj Umesh	Ethetke.
7865	Shinde Siddhesh Shivaji	Spinder
7866	Waghmode Kiran Bhimrao	Finde
7867	Yadav Durga Vaijanath	Fadaw,
7868	Gharale Karan Manohar	Kapatates
7555	Kanade Priyanka Swatantryakumar	Planade:
7870	Kalugade Sourabh Ravindra	JKJ.
7871	Sawant Arati Ashok	AGailants
7872	Shetke Atharav Sanjay	Anette
7873	Punekar Dipali Anil	Deurekoz
7874	Kharase Rushikesh Dayanand	(KR)

Internal Examinar. Dr. Trupti U. Urunkar Edentee



Suppliment No.:	
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Subject Astrophysics	
Roll No. : 7484 Test / Tutorial No. :	
Class : B.Sc - II Div. :	
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1 d) their distance from earth	
25 co radio galaxies	
31 as 76 years	
4× b> group of stars	
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91 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).

(2)	x* 5
1)	Manurement of brightness of a star is relative
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	stars or luminarity of at a with an artificial
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	method the at i grapt is and porto electric method
1	ere used for luncipality mant
	used to juminosity treasurement
*	* Photographic malled)
	This method is lived ofter 1840 AD and
	Lises the principle of photoeknoling is when a
	bhotowall's plate is prolography to light and
	device and the intensity of light is reflected on
	the photograph when some exposure time f
	identical conditions of obstaerablic plate develop
	sent is carried their stars of cancel luminasite
L	ordure
	optical image of a star is very Small but due
	to scattering of photons, through photocycephic
	Imulsion produce incide of considerable size the
~	size a image proportional to luminosity of a
10/	star.
/	Initially with a single starlight the
	photographic plates are exposed of different
	times like 5, 10, 20, 40, 80 seconds. etc. f
	images are developed. The pature of images as
	Shown.
/	Now the light from the star whose
	luminosity is to be measured is focused on
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	$\frac{1}{2} \left( \frac{1}{2} - \frac{1}{2} \right) \frac{1}{2} $
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	SUPPLIMENT	Signature of Supervisor				
Supplim	nent No. :	Subject : Astrophysics				
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1)	d) Their distance from	earth				
25	c) radio galaxies					
3)	a)76 years					
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6)-	as absorption	<ul> <li>Book and the second seco</li></ul>				
7)	a) o					
8)	d) 19 .					
( g)	b) stable					
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		T. 1964 5 (Autonomout)				

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 interval of the light and 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.