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 ESTD JUNE 1964 KOLHAPUR - 416003

HOD
Head of the
Department of Physics
Vivekanand College, Kolhapur

B.Sc. (Part-I) Semester- II Internal Examination 2019-20
Subject : Physics
Title : Electricity, Magnetism and electromagnetic theory
Paper No. II
Sub. Code : DSC -1001 B

Day & Date : Friday, 14/02/2020
Time : 10:30am to 11:10am **Total Marks : 20**

Instructions : 1) All questions are **compulsory**.
2) Figures to the right indicate **full** marks.
3) Draw neat labeled diagrams **wherever** necessary.
4) Use of log table/calculator is allowed.

Q.1 Select correct alternative. **(05)**

1. The line integral of electric force per unit charge over a closed path is ---------
   a) emf b) potential difference c) electric flux d) Magnetic Induction
2. Self inductance per unit length of a long solenoid with n turns per unit length and cross-sectional area A is,-----
   a) $\mu_0 nA$ b) n^2A c) μn^2A d) $\mu_0 n$
3. The mutual inductance per unit length of two windings with n1 and n2 turns per unit length over a frame of cross sectional area A is,---------
   a) $\frac{\mu_o n_1 n_2}{A}$ b) $\frac{\mu_o A}{n_1 n_2}$ c) $\frac{\mu_o n_1}{n_2 A}$ d) $\mu_o n_1 n_2 A$
4. The relation between magnetic induction B, magnetizing filed and intensity of magnetization is .....
   a) $B = \mu_0 (H + M)$ b) $H = \mu_0 (B + M)$ c) $M = \mu_0 (H + B)$ d) $B = (H + M)$
5. Magnetic susceptibility.....
   a) B/H b) H/ M c)MH d)M/H

Q.2) Attempt any ONE. **(10)**

1. Derive an expression for energy stored per unit volume in magnetic field.
2. Obtain an expression for magnetic filed due to straight conductor of finite length. Hence obtain an expression for magnetic field due to infinite straight conductor.

Q.3) Attempt any ONE. **(05)**

1. What is self inductance? Obtain an expression for self inductance of solenoid.
2. State and explain Biot- Savart's law .

Shri Swami Vivekanand Shikshan Sanstha's

Vivekanand College, Kolhapur

(Autonomous)

Department of Physics

Internal exam

B.Sc.I Sem II

Date:- 27/01/2020

Attendance Sheet

Roll No.	Name Of The Students	Signature
7001	Chauhan Aditi Brijesh	
7002	Bankar Ashwini Rajaram	
7003	Barwade Sammed Mahavir	
7004	Bhatmare Shivani Sanjay	
7005	Chaugale Rutika Tanaji	
7006	Desai Fiza Sikander	
7007	Desai Nilesh Dattatray	
7008	Desai Pranav Sanjay	
7009	Desai Pratiksha Jitendra	
7010	Deshmukh Swapnil Vitthal	
7011	Dhare Prajakta Ravindra	
7012	Ghorpade Prasad Shahaji	
7013	Gurav Santosh Ananda	
7014	Jadhav Aakanksha Chandrakant	
7015	Jadhav Shraddha Dinkar	
7016	Jagadale Amey Bhagawan	
7017	Jawale Shivam Nilkanth	
7018	Kabir Siddhi Suresh	
7019	Kamble Abhishek Pandurang	
7020	Kamble Ashlesha Ramesh	
7021	Kamble Ashwini Mohan	
7022	Kamble Sanket Shrimant	
7023	Kamble Swapnil Babasaheb	
7024	Kamble Vedant Chandrakant	
7025	Kandalkar Prafull Rajendra	
7026	Kane Shweta Bhausaheb	
7027	Khamkar Akash Baburao	
7028	Khekare Kallesh Chandrakant	
7029	Khtangle Nishikant Nivruti	
7030	Killedar Yogiraj Rajendra	
7031	Kolekar Pranali Ravikant	
7032	Koli Lalita Ramdas	
7033	Koli Nandini Siddharthshankar	
7034	Koshti Shweta Jitendra	
7035	Kumathekar Kedar Sanjay	
7036	Lohar Siddhesh Ravindra	

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7035	Kumathekar Kedar Sanjay	
7036	Lohar Siddhesh Ravindra	
7037	Magdum Samruddhi Gunda	
7038	Mane Supriya Narayan	
7039	Mathew Jisna Anoop	
7040	More Akshada Vijay	
7041	More Madhumati Tanaji	
7042	More Pranav Ashok	
7043	Mudrale Shweta Rahul	
7044	Mugdar Akanksha Nilesh	
7045	Mukkanawar Siddharth Sadanand	
7046	Naik Atharv Ajit	
7047	Nirmale Sakshi Sunil	
7048	Pareek Sangeeta Ramawatar	
7049	Parit Sumit Dipak	
7050	Patil Aditya Tatyaso	
7051	Patil Ashwini Ashok	
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7054	Patil Rajnandini Pratap	
7055	Patil Rasika Shahaji	
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7061	Ramchandani Khushi Deepak	
7062	Randive Rutuja Arvind	
7063	Rukadikar Sudhanshu Dilip	
7064	Sarnaik Yoesh Shivaji	
7065	Sayyed Tabassum Aijaz	
7066	Shidvankar Siraj Yasin	
7067	Shinde Sejal Sudhir	
7068	Shirke Pranali Pradeep	
7069	Solase Sakshi Subhash	
7070	Sutar Pravin Rajendra	
7071	Terdale Pranjali Anandkumar	
7072	Thanekar Vaibhav Mahendra	
7073	Tonpe Sejal Vijay	
7074	Ubare Sakshi Sanjay	
7075	Vadicharla Sandhya Krushnamurti	
7076	Veer Vikram Sarjerao	
7077	Vetale Rohit Bapu	
7078	Wadar Pramod Deepak	
7079	Warake Sakshi Sanjay	

7080	Ambekar Sakshi Mohan	
7081	Bagadi Shivani Prashant	
7082	Bam Shruti Harish	
7083	Belvalkar Surabhi Mahesh	
7084	Chougule Sanket Ranvidra	
7085	Chougule Suyash Praveen	
7086	Davang Omkar Tanaji	
7087	Desai Kayym Dadaso	
7088	Devadkar Bhaveshwar Shamrao	
7089	Dhamanekar Deepa Anil	
7090	Dhokare Sushant Digambar	
7091	Doke Vaibhav Eknath	
7092	Fadtare Sourabh Pratap	
7093	Firinge Rupesh Maruti	
7094	Gandure Manoj Dhanaji	
7095	Ganeshacharya Digvijay Yashawant	
7096	Gopane Siddhanath Chandrakant	
7097	Gove Vaishnavi Shashikant	
7098	Gudami Shrinivas Mallappa	
7099	Gundakalli Sakshi Sachin	
7100	Injar Pavan Satappa	
7101	Jadhav Ankita Sanjay	
7102	Jadhav Nikhil Jotiram	
7103	Jamadar Saad Akhtarhusen	
7104	Kadam Sandesh Santosh	
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7107	Kenjalekar Akash Shamrao	
7108	Khanaj Ketan Dattatray	
7109	Khandekar Tejas Milind	
7110	Kokate Prasad Shivaji	
7111	Kumbhar Souarbh Ravindra	
7112	Lad Abhijeet Keraba	
7113	Lambe Pratiksha Ranjeet	
7114	Magdum Rutuja Vitthal	
7115	Mali Prajwal Ashok	
7116	Mali Prajyot Sanjay	
7117	Maniyar Ahamadraza Goushmoddin	
7118	Mengane Prathamesh Prakash	
7119	Mude Gargi Anil	
7120	Mujawar Saniya Niyaj	
7121	Mullani Junaid Shahabuddin	
7122	Naik Mitali Vijay	
7123	Nashte Riteshkumar Rameshwar	
7124	Nerlekar Sourabh Krishnat	
7125	Pankar Digvijay Satappa	
7126	Patane Satyajeet Sudhakar	

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7170	Awale Dayasagar Rajendra	
7171	Bagade Aditya Kumar	
7172	Bagade Apoorva Kumar	
7173	Bagwan Umrajiya Shakil	

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7178	Chaluche Swapnil Arjun	
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7267	Shivatankar Shubham Anant	

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7269	Talkar Akanksha Vijay	
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7271	Tirale Samiksha Dattatray	
7272	Vanjari Koustubh Appasaheb	
7273	Waghmare Pratik Pandit	
7274	Wakrushe Divya Vitthal	
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7276	Yevaluje Swapnali Madhukar	
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7280	Chougale Ketan Krishnat	
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7283	Dinde Rutuja Amar	
7284	Ekal Sanket Sarjerao	
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7286	Jadhav Vaishnavi Ravaso	
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7288	Kharat Komal Laxman	
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7300	Shivane Ashutosh Dhanaji	
7301	Arade Samadhan Anil	
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7303	Dabade Amruta Shahaji	
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7305	Inamdar Ruturaj Sharad	
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7321	Prabhavale Uditanshu Sarang	
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Internal Examinar.....
(Dr. M. M. Karanjkar)

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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. :

Roll No. : 7014

Class : B.Sc I

Subject : Electricity & magnetism

Test / Tutorial No. : Internal exam

Div. :

10

Q.1

1) a) emf

2) a) $\mu_0 n A$

3) d) $\mu_0 n_1 n_2 A$

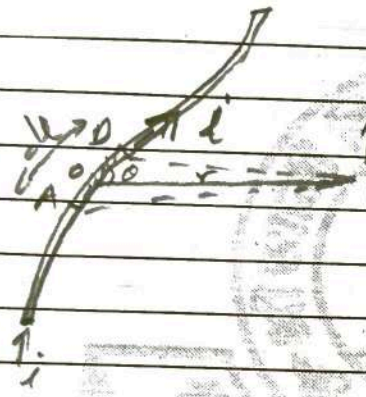
4) b) $H = \mu_0 (B + M)$

5) d) M/H

VIVEKANAND COLLEGE KOLHAPUR (Autonomous) ESTD JUNE 1964

Q.2

2) It states that the magnetic induction (dB) at a point (P) due to an element (AB) of a conductor is directly proportional to (a) its length (dl) (b) the current (i) passing through it. (c) $\sin\theta$, where θ is the angle made by the line joining the centre (o) of the element to P and (d) inversly proportional to the square (r^2) of the distance (r) of the point (P) from the element



05

$$\therefore dB \propto \frac{i \cdot dl \cdot \sin\theta}{r^2}$$

$$dB = \frac{\mu_0}{4\pi} \cdot \frac{i\,dl \cdot \sin\theta}{r^2} \quad \text{—— (i)}$$

$$dB = \frac{\mu_0}{4\pi} i \cdot \frac{dl \cdot r \cdot \sin\theta}{r^3}$$

$$\therefore d\vec{B} = \frac{\mu_0}{4\pi} i \cdot \frac{\vec{dl} \cdot \vec{r}}{r^3} \quad \text{—— (ii)}$$

where $\vec{OP} = \vec{r}$.

The magnetic induction $d\vec{B}$ acts in the direction perpendicular to the plane ADP, containing the element (AD) and the point (P) and its sense is given by the right hand rule

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SUPPLIMENT

Signature of Supervisor	

Suppliment No. : 19

Roll No. : 7018

Class : B.Sc I

Subject : Electricity & magnetism

Test / Tutorial No. : Internal Exam

Div. :

Q 1)

1) (c) Electric flux

2) (a) $\mu_0 nA$

3) (d) $\mu_0 n_1 n_2 A$

4) (b) $H = \mu_0 (B+M)$

5) (c) MIA

Q.2)

1) When a circuit is switched on the current in the circuit grows from 0 to I, where I is steady maximum current. When the current is changing at a rate $\frac{dI}{dt}$, a back emf $\mathcal{E}$ is developed in the circuit is given by,

$$\mathcal{E} = -L \frac{dI}{dt}$$

where L is the self inductance of the circuit work done against this back emf is regarded as energy stored in the magnetic field. This energy is recovered when the circuit is switched off.

∴ Work done per unit time is,

$$\frac{dw}{dt} = -\mathcal{E}I = -LI\frac{dI}{dt}$$

∴ Total work done to set up final current I is,

$$W = \int_0^t \frac{dw}{dt}\,dt = \int_0^t LI\frac{dI}{dt}\,dt = \int_0^I LI\,dI = \frac{1}{2}LI^2 \quad \text{---(1)}$$

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Thus total work done depends only on the self inductance and final current. It does not depend on the time interval required to grow the current to its final steady value.

$$\Phi = LI \quad \text{---(2)}$$

Also, Φ can be expressed in terms of magnetic field as,

$$\Phi = \int_S \vec{B}\cdot d\vec{S} = \int_S (\nabla \times \bar{A})\,d\vec{S} \quad \text{---(3)}$$

where, $\bar{A}$ is vector magnetic potential at the surface S of the loop bounded by the conductor C.

$$\therefore \vec{B} = \nabla \times \vec{A}$$

Now applying Stoke's theorem on RHS of eq^n (3) we get,

$$\Phi = \int_S \vec{B} \cdot d\vec{S} = \oint_C \vec{A} \cdot d\vec{l} \quad \text{---(4)}$$

From equations (2) and (4) we get,

$$LI = \oint_C \vec{A} \cdot d\vec{l}$$

$$W = \frac{1}{2} I \cdot \oint_C \vec{A} \cdot d\vec{l} = \frac{1}{2} \oint_C \vec{A} \cdot \vec{I}\, dL$$

$$= \frac{1}{2} \int_V A \cdot \vec{J} \cdot dV \quad \text{---(5)}$$

This equation gives work done in terms of volume current density $\vec{J}$.

Q 2)

3) Biot - Savart's law →

Biot Savart's law states that, the magnetic field at a point due to a small element of current carrying conductor is directly proportional to the length of the element, directly proportional to the current flowing through it, directly proportional to the sine of the angle between the element and the line joining the centre of the element to the point and inversely proportional to the square of the distance of the point from the centre of element.

04

i.e. $$dB \propto \frac{I\, dl \sin\theta}{r^2}$$

$$dB = K \frac{I dl \sin\theta}{r^2}$$