ç'u 2- fdlh o|r f}/ko d dkj.k fuj{kh; fLFkfr e fdlh fcUn ij fo|r {k= dh rhork dk 0;tdRié dhft,A

Derive expression for electric field at a point due to electric dipole in equatorial position.

OR

vkof'kr Bkl cyukdkj pkyd d dkj.k fdlh fcUn ij fo|r {k= dh rhork dh x.kuk dhft,A

Determine intensity of electric field at any point due to solid charged cylindrical conductor.

ç'u 3- Dykmfl;ldy-elkVh lehdj.k fyf[k, rFkk fuxfer dhft,A

Write the Clausius-Mossotti equation and derive it.

OR

iR;korh /kkjk ifjiFk e ,d i.k pØ e vklr lkeF; d fy; l= fuxfer dhft,A okVghu /kkjk l D;k le>r gk\ mnkgj.k n dj le>kb;A

Derive expression for average power for a complete cycle of alternating current. What do you understand by wattless current? Explain with example.

ç'u 4- ck;k-lokV fu;e dh 0;k[;k dhft, rFkk bldh lgk;rk l /kkjkokgh j[kh; pkyd d dkj.k fdlh fcUn ij {k= dh rhork Kkr dhft,A

Explain Biot-Savert law and find intensity of electric field at a current carrying straight conductor with its help.

OR

$\vec{B}$, $\vec{H}$ rFkk $\vec{M}$ dk le>kb; rFkk fl) dhft, fd $\vec{B} = \mu_o(\vec{H} + \vec{M})$

Explain $\vec{B}$, $\vec{H}$ and $\vec{M}$ and prove that $\vec{B} = \mu_o(\vec{H} + \vec{M})$

ç'u 5- Loij.k rFkk vU;kU; ij.k dk ifjHkkf"kr dhft, rFkk nk d.Mfy;k d Loijdÿo rFkk vU;kU; ijdÿo e lc/k LFkkfir dhft,A

Define self-induction and mutual inductance and derive an expression for relation between self inductance and mutual inductance.

OR

eDloy d lehdj.k fyf[k; rFkk bUg fuxfer djA

Write and deduce Maxwell's equation.

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Roll No..... Total No. of Sections : 03

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Annual Examination - 2018

B.Sc.-I

PHYSICS

Paper - II

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

Max.Marks : 50

Time : 3 Hrs. **Min.Marks : 17**

Vhi % **[k.M ^v* esa nl vfry?kÿkjh i'u gSa] ftUgsa gy djuk vfuok;Z gSA [k.M ^c* esa y?kÿkjh ç'u ,oa [k.M ^l* esa nh?k mÿkjh ç'u gSA [k.M ^v* dks lcls igys gy djsaA**

Note : Section 'A', containing 10 very short-answer-type questions, is compulsory. Section 'B' consists of short-answer-type questions and Section 'C' consists of long-answer-type questions. Section 'A' has to be solved first.

Section - 'A'

fuEukfdr vfry?kÿkjh ç'uksa d mÿkj ,d ;k nks okD;ksa e nsaA

Answer the following very short-answer-type questions in one or two sentences. **(1x10=10)**

ç'u 1- ifjHkk"kr oDVj {k= l D;k rkRi;Z gS\

What is meant by Solenoidal vector field?

ç'u 2- ;fn P=$P_{(V, T)}$ rks P dk i.k vodyu D;k gksxk\

If P=$P_{(V, T)}$ then what will be the perfect differential of P.

ç'u 3- ,d fo|r f}/ko l rnjh ij fLFkr fcUn ij fo|r {k= dk eku D;k gksrk gS\

What will be the value of electric field due to an electric dipole at a point at distance r from the dipole?

ç'u 4- ,d o|r f}/o dks ,d leku fo|r {k= ej[kk tkrk gS rks mlij fdruk cy yxxk\

An electric dipole is placed in a uniform electric field then how much force will be exerted on it?

P.T.O.

ç'u 5- pEcdh; iofYk rFkk fo|r'khyrk e D;k lEcU/k g\ ¼l= fyf[k;½A
What is the relation between magnetic susceptibility and permitivity? (Write formula)

ç'u 6- LCR ifjiFk e ;fn Z ifjiFk dh ifrck/kk g rk 'kfä x.kkd D;k gkxk\
If Z is the impedence of a LCR circuit then what will be the power factor?

ç'u 7- ykjt cy D;k g\ bld U;ure o vf/kdre gku dh 'krZ D;k g\
What is Lorentz force? What are the conditions for it to be maximum and minimum?

ç'u 8- c) /kkjk, D;k g\ D;k bUg ekik tk ldrk g\
What are bound currents? Can it be measured?

ç'u 9- QjkM d fo|r pEcdh; ij.k dk lekdyu rFkk vodyu :i fyf[k;A
Write integral and differential forms or Faraday's law.

ç'u 10- lokbfVx lfn'k D;k g\ bldk ek=d o foeh; l= fyf[k;A
What is poynting vector? Write its unit and dimensional formula.

Section - 'B'

**fuEukfdr y?k mÙkjh; ç'uk d mÙkj 150&200 'kCn lhek e n
Answer the following short-answer-type questions with word limit 150-200 (3x5=15)**

ç'u 1- ;fn $\vec{A}+\vec{B}=\vec{C}$ rFkk $A^2+B^2=C^2$ gk rk fl) dhft, fd rFkk $\vec{A}$ $\vec{B}$ ijLij yEcor gA
If $\vec{A}+\vec{B}=\vec{C}$ and $A^2+B^2=C^2$ then prove that and $\vec{A}$ $\vec{B}$ are mutually perpendicular.

OR

fdlh oDVj {k= d Mkbot U l dk vFk rFkk Hkkfrd egÙo fyf[k;A
Write the meaning and physical significance of the divergence of a vector.

ç'u 2- fLFkj o|frdh e xkl d ie; fyf[k; ,o fl) dhft,A
State and prove Gauss's law for electrostatics.

OR

fl) dhft, fd@Prove that : $\vec{E}=-\nabla\phi$

ç'u 3- fdjpkQ d fu;e dh lfp= O;k[;k dhft;A
Explain Kirchoff's rule giving diagram.

OR

foLFkkiu lfn'k $\vec{D}$ l D;k vfHkik; g\ le>kb,A
Explain the concept of Displacement vector $\vec{D}$.

ç'u 4- fdlh byDVku dh d{kh; rFkk pØ.k xfr d dkj.k tk;jk eXufVd vuikr dk l= fyf[k,A
Write the formula for gyromagnetic ratio due to orbital motion and spin motion of an electron.

OR

,fEi;j d ifjiFkh; fu;e dk ¼1½ pEcdh; inkFk d ckgj rFkk ¼2½ pEcdh; inkFk d vUnj vodyu :i e O;ä dhft,A
Express Ampere's Circuital law in differential form for (i) Outside the magnetic substance (ii) inside the magnetic substance.

ç'u 5- fl) dhft; fd fo|r-pEcdh; rjx e $\vec{E}$ rFkk $\vec{B}$ rjx d lpj.k dh fn'kk d yEcor gkr gA
Prove that the electric field vector $\vec{E}$ and magnetic field vector $\vec{B}$ in an electromagnetic wave are perpendicular to wave propagation.

OR

fl) dhft, dy $\vec{E}=-\frac{\partial B}{\partial t}$

Prove that curl $\vec{E}=-\frac{\partial B}{\partial t}$

Section - 'C'

**fuEukfdr nh?k mÙkjh; ç'uk d mÙkj 300&350 'kCn lhek e n
Answer the following long-answer-type questions with word limit 300-350 (5x5=25)**

ç'u 1- xhu dk ie; fy[kdj fl) dhft, A
State and prove Green's theorem.

OR

lfn'k {k= d Mkbot l dh O;k[;k dhft, rFkk mldk Hkkfrd egÙo fyf[k,A
Explain the divergence of a vector field and write its physical significance.

P.T.O.