

(4) Code No. : B-204(A)

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Annual Examination - 2017

B.Sc. - I

PHYSICS

Paper - II

ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

Max.Marks : 50

Time : 3 Hrs.

Min.Marks : 17

Vhi % [k.M ^* eanl vfry?Wkjh izu gftlga gy djuk vfuok;Z gA [k.M ^* eay?Wkjh c'u ,oa [k.M ^* eanl?Z mYkjh c'u gA [k.M ^* dslcl sigysgy djA

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'

fufufdr vfry?Wkjh c'ula dsmYkj ,d ;k nls oD;ka eanA (Answer the following very short-answer-type questions in one or two sentences.) (1x10=10)

c'u 1- l fn'k {ks= dsfdl h fclnqij ml dk Mkbotll ,d-----jlf'k gkrk gA Divergence of a point in the vector field is a.....quantity.

c'u 2- fo|q {ks= dh rhork dk ek=d fyf[k,A Write the unit of intensity of electric field.

c'u 3- fo|q folko rFk fo|q {ks= dh rhork eal cak crkb,A Show the relation between electric potential and intensity of electric field.

c'u 4- vkof'kr [kk[kyscyu dsvnj fdl h fclnqij fo|q {ks= dh rhork dk eku D;k gkrk gS What is the value of intensity of electric field in charged hollow cylinder?

P.T.O.

fo|q f}/k dsdkj.k v{kh; fLFkr eafdl h fclnqij fo|q {ks= dh rhork dk eku Kkr dhft ,A

Determine the electric field intensity due to electric dipole in end on position.

OR

fo|q f}yDI l sD;k vfHk;k; gS xkW dsieş dksfy[kdj fl) dhft ,A What do you understand by Electric Flux? State and prove Gauss theorem.

Dykmlf ; l &el ksh l ehdj.k fyf[k, rFk fuxfer dhft ,A

Write the Clausius-Mossotti equation and derive it.

OR

LCR ifjiFk eaJskh vuqkn dks l e>kb, rFk vuqkn vkof'k dk 0; at d i klr dhft ,A

Explain series resonance in LCR circuit and derive an expression for resonance frequency.

vodyu : i ealFkj pfcdr dsew fu; e fy[kdj 0; qie dhft ,A

Give basic laws of magnetostatic in differential form and derive it.

OR

B, H rFk M eal cak LFkfir dhft ,A

Derive an expression between B, H and M

Loij.k rFk vU; kb; ij.k dks ifjHkkf'kr dhft, rFk nls dqMfy; ka ds LoijdYo rFk vU; kb; ij dYo eal cak LFkfir dhft ,A

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

OR

fo|q&pqdh; {ks= eal fpr Atk?kuRo dsfy, 0; at d 0; qie dhft ,A

Derive an expression for stored energy density in electromagnetic field.

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OR

OR

OR

OR

Section - 'C'

OR

P.T.O.

5- Write the relation between relative permittivity and electric susceptibility.

6- If quality factor of a circuit is 1.26x10^3, what will be the band width of resonance frequency of 10^4 Hertz?

7- What is time-constant of L-R Circuit?

8- What is relation between r.m.s. value and peak value of alternating current?

9- Express the relation between B, H and M.

10- Explain Lorentz force and define B with its help.

Derive Maxwell's first equation.

Section - 'B'

Answer the following short-answer-type questions with word limit 150-200(3x5=15)

1- Determine the reciprocal vector for 2i, 3j and 4k.

OR

Explain the physical importance of curl of a vector field with its definition.

2- Prove that: E = - grad phi

Determine the intensity of electric field at any point due to point charge.

3- Explain the concept of dielectric polarization vector.

Explain the discharge of condenser in circuit with resistance.

4- Write the differential form of Ampere's circuital law.

OR

Explain Lorentz force and define B with its help.

5- Derive Maxwell's first equation.

What is the value of energy stored in an inductor in static magnetic field.

Answer the following long-answer-type questions with word limit 300-350 (5x5=25)

1- State and prove Stoke's Theorem.

State and prove Green's Theorem.