OR

lykd d forj.k fu;e l ¼i½ ohu dk fu;e ¼ii½ jy thu dk fu;e fuxfer dhft ;A

Deduce (i) Wein's law (ii) Rayleigh-Jean's law from Planck's distribution law.

ç'u 3- xlk dk dkfrd rki] ck;y dk rki ,o 0;RØe.k rki dk ifjHkkf"kr dhft, ,o mud chp lc/k LFkkfir dhft ,A

Define critical temperature, Boyle's temperature and inversion temperature of a gas. Establish the relationship between them.

OR

xlk e folj.k-n0;eku dk LFkkukrj.k le>kb; rFkk fl) dhft; $D \propto T^{3/2}$.

Explain Diffusion in Gases-transport of mass and prove that $D \propto T^{3/2}$.

ç'u 4- Åtk dk lefoHkktu fu;e fyf[k; rFkk lkf[;dh }kjk bldk fuxeu dhft ,A

Write the law of equipartition of energy and deduce it from statistics.

OR

m"eh; lEid e nk fudk;k dk lUryu le>kb;A

Describe the equilibrium between two systems in thermal contact.

ç'u 5- eDloy-ckYVteu lkf[;dh dk forj.k fu;e LFkkfir dhft ,A

Establish the distribution law of Maxwell-Boltzmann statistics.

OR

ckl-vkbLVhu lkf[;dh dk forj.k fu;e LFkkfir dhft ,A

Establish the Bose-Einstein statistics distribution law.

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

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Annual Examination - 2019

B.Sc. Part - II

PHYSICS

Paper - I

THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

Max.Marks : 50

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

Vhi ¼ [k.M ^v* e nl vfry?kŸkjh i'u gS] ftUgs gy djuk vfuok;Z gA [k.M ^c* e y?kŸkjh ç'u ,oa [k.M ^l* e nh?kZ mŸkjh ç'u gSA [k.M ^v* dk lcl igyw gy djsA

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 nsA

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

ç'u 1- levk;fud iØe fdl dgrs gSa\

What is isochoric process?

ç'u 2- btu dh n{krk d fy, l= fyf[k;A

Write the formula for efficiency of Engine.

ç'u 3- fxCl&ckYVteu dk fu;e fyf[k;A

Write the first equation of Gibb's-Helmholtz equation.

ç'u 4- LVhQu&ckYVteu dk fu;e fyf[k;A

Write the Stefan-Boltzmann's law.

P.T.O.

ç'u 5- fdlh xl d ek/; eDr iFk λ ,o mld nkc P e lc/k fyf[k;A

Write the relation between mean free path λ and its pressure P of any gas.

ç'u 6- v.kvk dh lokf/kd iEHkkO; Åtk dk eku fdruk gkrk g\

What is the value of most probable energy of molecules?

ç'u 7- "kVfoeh; dyk vkdk'k e ,d dyk dkf"Bdk dk vk;ru fdruk gkrk g\

What is the valume of a phase cell in six dimensional phase space?

ç'u 8- ckYVteu dk ,UVkih-ikf;drk lc/k D;k g\

What is the Boltzmann's entropy-probability relation?

ç'u 9- ckluu dk pØ.k D;k gkrk g\

What is the spin of Boson?

ç'u 10- Qehvku d.kk d uke fyf[k;A

Write the name of Fermion particles.

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- Å"ekxfrdh dk iFke fu;e fyf[k; rFkk ml le>kb;A

Write the first law of thermodynamics and explain it.

OR

fl) dhft, fd :)k"e iØe e ,UVkih e ifjoru fu;r jgrh gA

Prove that the change in entropy in adiabatic process is constant.

ç'u 2- Å"ekxfrd foHkkok d uke fyf[k; ,o mUg le>kb;A

Write the name of thermodynamic potentials and explain it.

OR

gYegkYVt eDr Åtk D;k g\

What is Helmholtz free energy?

ç'u 3- o.kØe j[kkvk dk Mkyj foLrrhdj.k dk le>kb,A

Explain Doppler's Broadening of spectral line.

OR

fdlh xl d v.k dk ek/; eDr iFk] xl d rki ,o nkc ij fdl idkj iHkkfor djrk g\

How is the mean free path of gas affected by the temperature and pressure of gas?

ç'u 4- io ikf;drk d fl)kr dk le>kb;A

Explain the principle of equal a Priori probabilities.

OR

dyk vkdk'k] μ vkdk'k rFkk Γ vkdk'k dk le>kb;A

Explain phase space, μ space and Γ space.

ç'u 5- Qeh-fMjkd lkf[;dh dh ey vfHkdYiuk, fyf[k,A

Write the basic assumptions of Fermi-Dirac Statistics.

OR

foHk| rFkk vfoHk| d.kk e vrj Li"V dhft,A

Distinguish between distinguishable and indistinguishable particles.

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- dkuk ie; fyf[k; ,o fl) dhft;A

State and prove Carnot's theorem.

OR

rki dk Å"ekxfrd iekuk D;k g\ bl ieku dk ije 'kU; dk le>kb,A

What is thermodynamics scale of temperature? Explain absolute zero of this scale.

ç'u 2- ,UFkkYih dk ifjHkkf"kr dhft; ,o $\left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P$ lc/k dk fuxfer dhft;A

Define Enthalpy and deduce the expression $\left(\frac{\partial T}{\partial P}\right)_S = \left(\frac{\partial V}{\partial S}\right)_P$.

P.T.O.