ç'u 2- ty-Fkkelu iHkko ls vki D;k le>rs g\ n'kkb,, fd vkn'k xSl d fy, ty-Fkkelu x.kkd] $\mu = 0$ gksrk gA

What do you mean by Joule-Thomson effect? Show that for an ideal gas Joule-Thomson coefficient, $\mu = 0$.

OR

Ñ".k fi.M fofdj.k d fy, fl) dhft, λT = fu;rkd

For Black-body radiation, prove that λT = constant.

ç'u 3- fdlh xSl d ';kurk x.kkd d fy, O;td fuxfer dhft,A

Deduce an expression for the coefficient of viscosity of a gas.

OR

ghfy;e d æohdj.k dh fof/k dk o.ku dhft,A

Describe a method to liquify helium.

ç'u 4- ckYVteu dukfudy fu;e fyf[k, rFkk fl) dhft,A

State and prove Boltzmann canonical law.

OR

,d foeh; ckDl e cUn d.k dh Åtk d fy, O;td iklr dhft,A

Obtain an expression for the energy of a particle enclosed in a one dimensional box.

çu 5- Qeh fMjkd lkf[;dh d fy, forj.k Qyu iklr dhft,A

Obtain distribution function for Fermi-Dirac statistics.

OR

eDloy-ckYVteu lkf[;dh] ckl-vkbULVhu ,o Qeh-fMjkd lkf[;dh e vUrj Li"V dhft,A

Distinguish between Maxwell-Boltzmann statistics, Bose-Einstein statistics, and Fermi-Dirac statistics.

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

Total No. of Printed Pages : 04

Code No. : S-253

Annual Examination - 2018

B.Sc. Part - II

PHYSICS

Paper - I

THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

Max.Marks : 50

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

Vhi % **[k.M ^v* e nl vfry?kÙkjh iz'u gS] ftUgs gy djuk vfuok;Z gA [k.M ^c* e y?kÙkjh ç'u ,o [k.M ^l* e nh?k mÙkjh ç'u gA [k.M ^v* dk lcls igy gy 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'

fuEukfdr vfry?kÙkjh ç'uk d mÙkj ,d ;k nk okD;k e nA

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

çu 1- ,.Vkih dk ifjHkkf"kr dhft,A

Define entropy.

çu 2- C_p ,o C_v e D;k lc/k g\

What is the relation between C_p and C_v?

çu 3- btu dh n{krk ls D;k rkRi;Z g\

What do you mean by efficiency of an engine?

çu 4- ,.Vkih ,o Å"ekxfrd ikf;drk e lc/k nhft,A

Give the relation between entropy and thermodynamic probability.

P.T.O.

ç'u 5- fofdj.k d fy, fdjpkQ dk fu;e fyf[k,A

State Kirchhoff's law for radiation.

ç'u 6- lkj fu;rkd dk ifjHkkf"kr dhft,A

Define solar constant.

ç'u 7- ikf;drk dk ifjHkkf"kr dhft,A

Define probability.

ç'u 8- dyk vkdk'k l D;k rkRi;a g\

What do you mean by phase space?

ç'u 9- Qehvku D;k g\

What is fermion?

ç'u 10-Qeh Åtk dk ifjHkkf"kr dhft,A

Define fermi energy.

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 'kU;ok fu;e fyf[k, rFkk rki dh vfHk/kkj.kk dk le>kb,A

Write the Zeroth law of thermodynamics and explain the concept of temperature.

OR

ekx Qyu ,o fcUn Qyu e vUrj Li"V dhft,A

Distinguish between path function and point function.

ç'u 2- xlr Å"ek dk Dykfl;l Dyijku lehdj.k 0;RiUu dhft,A

Establish Clausius-Clapeyron's equation of latent heat.

OR

fofdj.k lc/kh lykd dh DokVe ifjdYiuk dk fyf[k,A

Write Planck's quantum hypothesis of radiation.

ç'u 3- xlk e vfHkxeu ?kVukvk dk le>kb,A

Explain the transport phenomenon in gases.

OR

o.kØe j[kkvk dk MkIyj foLrrhdj.k dk le>kb,A

Explain the Doppler broadening of spectral lines.

ç'u 4- vfHkxE; l{e voLFkkvk dk mnkgj.k lfgr le>kb,A

Explain accessible microstates with example.

OR

lkf[;dh ;kf=dh dh e[; vfHkdYiuk, fyf[k,A

Write the fundamental postulates of statistical mechanics.

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

State the basic assumptions of Fermi-Dirac statistics.

OR

foHk| d.k rFkk vfoHk| d.k e vUrj 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- Å"ekxfrdh d f}rh; fu;e d nkuk dFkuk dk fyf[k, rFkk mudh lerY;rk n'kkb,A

State both the statements of Second law of thermodynamics and show their equivalence.

OR

dfYou d rki d Å"ekxfrdh ekiØe dk le>kb, ,o bl ekiØe d 'kU; rFkk fMxh d vkdkj dk le>kb,A

Explain Kelvin's thermodyanamic scale of temperature and explain zero of the scale and size of the degree.

P.T.O.