



Sanjay Ghodawat University, Kolhapur

Established as State Private University under Govt. of Maharashtra. Act No XL, 2017

2019-20

EXM/P/09/00

B. Sc-II

School of Science

Sem III

PHS201

Physics-III

Max

Marks: 20

Day: Monday

Date: 18/11/2019

Section-A
End Semester Examination
Time: 30 minutes

10:30am to 11am

Seat No.:

PRN No.:

Student Sign:

Invigilator Sign:

Examiner Sign:

Marks Obtained:

Instructions:

- 1) All Questions are compulsory.
- 2) Mark \checkmark to the correct option. Do not circle.
- 3) More than one options marked will not be considered for assessment.
- 4) Rough calculations on paper are not allowed.
- 5) Use of non-programmable calculator is allowed.

Q.1 Select the correct alternative

Marks (12) Bloom's level CO

1. The property that is independent on mass of the system is called as ----- property. 01 L3 201.1

- | | |
|--------------|--------------|
| a) extensive | b) intensive |
| c) thermal | d) physical |

2. Algebraic sum of net heat and work interaction between system and surrounding in a thermodynamic cycle is ----- 01 L1 201.1

- | | |
|---------|----------|
| a) Zero | b) One |
| c) Two | d) Three |

3. For isothermal expansion, entropy ----- 01 L1 201.2

- | | |
|-----------------|--------------|
| a) Increases | b) Decreases |
| c) Remains same | d) Zero |

4. Helmholtz free energy is given by ----- 01 L1 201.2

12. The spin angular momentum for bosons is given by, ----- 01 L1 201.4
- a) $n\hbar/2$ b) \hbar
- c) $n\hbar$ d) $2n\hbar$

ESE



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2019-20

EXM/P/09/00

B. Sc II

School of Science

Sem III

Course code
PHS201

Course title Physics III
Section-B
(Thermal Physics and Statistical Mechanics)

Max
Marks: 80

Day: Monday

End Semester Examination

Date: 18/11/2019

Time: 2.30 hr

11am to 1.30pm.

Instructions:

- 1) All Questions are compulsory.
- 2) Rough calculations on paper are not allowed.
- 3) Use non-programmable calculator is allowed.

Q.2	Answer the following questions	Marks (12)	Bloom's level	201.1
a)	Explain thermodynamic process and quasi equilibrium state.	8	L2	
b)	Derive the expression for specific heat at constant pressure.	4	L3	
	OR			
b)	Derive the expression for work done during an isothermal process.	4	L3	
Q.3	Answer the following questions	Marks (12)	Bloom's level	201.2
a)	Explain thermodynamic potentials in detail.	8	L2	
	OR			
a)	State and prove Carnot's theorem.	8	L2	
b)	What is the size of a degree?	4	L4	
	OR			
b)	A Carnot's engine has an efficiency of 30 % when the temperature of the sink is 27 °C. What must be the change in temperature of the source to make its efficiency 50 %.	4	L4	

ESE

Q.4	Answer the following questions	Marks (28)	Bloom's level	201.3
a)	Derive Maxwell-Boltzmann distribution and calculate values of constants.	16	L3	
b)	Derive the expression for root mean square (r.m.s.) velocity.	8	L2	
	OR			
b)	What is a transport of thermal conductivity? Derive the expression for coefficient of thermal conductivity.	8	L2	
c)	Derive the expression for mean free path.	4	L1	

Q.5	Answer the following questions	Marks (28)	Bloom's level	201.4
a)	Derive Planck's radiation law.	16	L3	
b)	Derive Stefan's Law from Planck's radiation law.	8	L3	
	OR			
b)	Derive Fermi-Dirac Distribution law.	8	L3	
c)	What is Phase space?	4	L1	