TEACHING SCHEDULE 2019-2020

SEMESTER: II

CLASS: F.Y.B.Sc**.**

SUBJECT: PHYSICS

COURSE TITLE: HEAT & THERMODYNAMICS [CORE]

COURSE CODE: PHY-II.C-3

DAYS & TIME: FRIDAY [08.30am – 09.30am] [13:30 – 14:30]

SATURDAY [13:30 – 14:30],

Lecture No.	Topic/subtopic	Reference List	Page No.
1	**1. Thermometry:** Review of concept of heat and temperature, Thermometry, Types of thermometers.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	489-491
2	Types of thermometers contd. Centrigrade, Fahrenheit, Rankine Scales and relations between them.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	491-493
3	Liquid thermometers, Errors and corrections in a mercury thermometer.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	494-496
4	Advantages of gas thermometer,	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and	496-498

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	Constant volume air thermometer, constant pressure air thermometer.	Statistical Physics, S. Chand (2007)	
5	Platinum resistance thermometer, thermoelectricity, Seebeck effect, Peltier effect, Thomson effect.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	498-501
6	Thermoelectric thermometer (thermocouple). Problems.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	501-504
7	**2. Equation of State:** Introduction, equation of state, different kinds of equations of state.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	48-54
8	Andrews' experiment, results of Andrews' experiment, critical constants, definitions of critical temperature, critical pressure, critical volume.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	48-54
9	Amagat's experiment, results of Amagat's experiment.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	48-54
10	Van der Waals' equation of state, Correction for finite size of molecule, correction for inter-molecular attraction.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	57-60

11	Discussion of Van der Waals' equation, defects of Van der Waals' equation, determination of a and b in Van der Waals' equation.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	57-60
12	Derivation of critical constants, reduced equation of state, Boyle temperature.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	57-60
13	Problems on equation of state.		
14	**3. Laws of thermodynamics:** Thermodynamic system, Thermodynamic variables, Thermodynamic equilibrium, and Thermodynamic processes.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	107-111
15	Zeroth law of thermodynamics, Concept of work and internal energy, First law of thermodynamics. Mathematical statement.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	107-112
16	Isothermal and adiabatic changes, Work done in isothermal and adiabatic changes.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	120-124
17	Relation between pressure, volume and temperature in adiabatic process.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	120-124

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18	Problem solving using formula for P_C, V_C, and T_C.		
19	Problem solving using formula for P_C, V_C, and T_C.		
20	Reversible and irreversible processes, illustrations of irreversible processes.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	132-134
21	Heat engines, Carnot's engine.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	132-134
22	Carnot's engine. Efficiency of heat engine.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	132-134
23	Reversibility of Carnot's engine.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	139-140
24	Second law of thermodynamics. Clausius statement, Kelvin-Planck statement. Carnot's theorem and proof	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	139-140

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25	Thermodynamic scale of temperature.	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	183-187
26	Clausius – Clapeyron equation, First latent heat equation.	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	224-225
27	Second latent heat equation.	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	224-225
28	Problem solving on efficiency of Carnot's engine.		
29	**4. Applications of first and second law of thermodynamics:** Applications of first law of thermodynamics.	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	115
30	Description of Otto engine	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	143-145
31	Expression for efficiency of Otto engine	Brijlal, Subramanyam N., Hemne P.S., <u>Heat Thermodynamics and Statistical Physics</u>, S. Chand (2007)	143-145

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32	Problems on Otto engine	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	
33	Description of Diesel engine	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	145-148
34	Expression for efficiency of Diesel engine	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	145-148
35	Problems on Diesel engine		
36	Comparison between Diesel and Otto engine. Introduction to refrigerator, Principle of refrigerator,	Saha M.N., Shrivastava B.N., Treatise on Heat, The Indian Press (1965)	
37	Coefficient of performance of refrigerator.	Saha M.N., Shrivastava B.N., Treatise on Heat, The Indian Press (1965)	
38	Principle of air conditioning	Saha M.N., Shrivastava B.N., Treatise on Heat, The Indian Press (1965)	
39	Comfort chart of A.C. machine, Factors affecting size and capacity of A.C. machine.	Saha M.N., Shrivastava B.N., Treatise on Heat, The Indian Press (1965)	

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40	**5. Concept of Entropy:** Changes of entropy during reversible and irreversible process.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	173,176-177
41	Temperature – Entropy diagram, Temperature – Entropy diagram of Carnot's cycle.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	179, 181
42	Physical significance of Entropy, Entropy of a perfect gas.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	177, 180
43	Principle of increase of entropy.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	187-190
44	Third law of thermodynamics.	Brijlal, Subramanyam N., Hemne P.S., Heat Thermodynamics and Statistical Physics, S. Chand (2007)	187-190
45	Problem solving		
46	Problem solving		

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