

Sl. No. of Ques. Paper : 2438

F-4

Unique Paper Code : 2112501

Name of Paper : Psychology for Healthy Living

Name of Course : B.Sc. Allied Course

Semester : IV

Duration : 3 hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

(इस प्रश्न-पत्र के मिलते ही ऊपर दिये गये निर्धारित स्थान पर अपना अनुक्रमांक लिखिये।)

NOTE:—Answers may be written either in English or in Hindi; but the same medium should be used throughout the paper.

टिप्पणी:—इस प्रश्नपत्र का उत्तर अंग्रेज़ी या हिन्दी किसी एक भाषा में दीजिए; लेकिन सभी उत्तरों का माध्यम एक ही होना चाहिए।

Attempt any three questions from Part A and attempt any three questions from Part B. The questions of Part A shall carry 5 marks each and questions of Part B shall carry 20 marks each.

भाग अ में से कोई तीन प्रश्न कीजिये। प्रत्येक प्रश्न 5 अंक का है। भाग ब से भी कोई तीन प्रश्न कीजिए। प्रत्येक प्रश्न 20 अंक का है।

PART A (भाग अ)

1. Explain the terms health and wellness.

स्वास्थ्य तथा वेलनेस शब्दों की व्याख्या कीजिए।

2. Explain emotion focussed technique.

भावना आधारित तकनीक की व्याख्या कीजिए।

3. Explain Anorexia Nervosa and Bulimia Nervosa.

एनोरेक्सिया नर्वोसा तथा बूलीमिया नर्वोसा की व्याख्या कीजिए।

4. What are the reasons for not exercising? Explain briefly.

व्यायाम न करने के क्या कारण हैं? संक्षेप में समझाइए।

This question paper contains two printed pages.

Your Roll No.

Sl. No. of Question paper: 2440

Unique paper code : 2222301

Name of the paper: Thermal Physics

Name of the course: B.Tech. Polymer Science

Semester : IV

Time : 3 Hours

Maximum Marks : 75

F-4

Attempts any five questions in all, including question no 1, which is compulsory

1. Attempt any five of the following:

3 x 5 = 15

- (a) Draw a T-S diagram for a Carnot's cycle indicating the four different processes.
- (b) Derive an expression for the work done during the adiabatic expansion of an ideal gas.
- (c) How can the concept of temperature be derived from the Zeroth law of thermodynamics?
- (d) Write two energy equations and derive any one of them using suitable Maxwell's relations.
- (e) Efficiency of a Carnot's engine changes from $1/6$ to $1/3$ when the source temperature is raised by 100 K. Calculate the temperature of the sink.
- (f) Obtain the mathematical form of the Second law of thermodynamics.
- (g) Calculate the mean free path of molecules of a gas when the number density is 3×10^{25} molecules per m^3 and diameter of each molecule is 2 Å.

2. (a) What is mean free path of gas molecules? Derive the expression for the mean free path

$$\lambda = 1 / \pi \sigma^2 n$$

where the symbols have their usual meanings. (7)

(b) Starting from Maxwell's law of distribution of velocities obtain expressions for root mean square velocity (C_{rms}), average velocity (C_{av}) and most probable velocity (C_{mp}). Illustrate these velocities in the distribution curve. (8)

3. (a) On the basis of kinetic theory, derive an expression for thermal conductivity of a gas. (7)

(b) State and explain the law of equipartition of energy and apply it to study the specific heats of monoatomic, diatomic and triatomic gases. (8)

4. (a) State Kelvin -Planck and Clausius statements of second law of thermodynamics. Show that the two statements lead to the same conclusion. (7)

(b) What is Carnot's engine? Describe its operation with the help of a P-V diagram and derive an expression for its efficiency. (8)

5. (a) Establish the Clausius inequality theorem. What is meant by 'Energy Degradation' and 'Heat Death'? (8)

(b) Prove that the ratio of adiabatic elasticity to isothermal elasticity is equal to the ratio of specific heat of a gas at constant pressure to that at constant volume. (7)

6. (a) Define four thermodynamic potentials. Why are they so called? Derive Maxwell's four thermodynamic relations by using these potentials. (10)

(b) Give a brief account of Nernst Heat Theorem. How does it lead to unattainability of absolute zero temperature? (5)

7. (a) What are first order and second order phase transitions? Derive Clausius – Clapeyron equation for latent heat. (7)

(b) Derive the two TdS equations. (8)

8. What is Quantum theory of radiation? Deduce Planck's radiation formula for a black body. Show that the Wien's law and Rayleigh Jeans law can be derived from it. (15)