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MS 2141

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION OF THERMODYNAMIC (SECOND YEAR) STUDENTS OF MATERIAL SCIENCE			
	COURSE TITLE:	thermodynamic		COURSE CODE: 2141
DATE:	27-12-2013	TERM: FIREST	TOTAL ASSESSMENT MARKS:150	TIME ALLOWED: 2 HOURS

Q1-Choose the correct answer (45)

1-A system suffers an increase in internal energy of 80 J and at the same time has 50 J of work done on it. What is the heat change of the system?

(a) +130 J (b) +30 J (c) -130 J (d) -30 J (e) 0 J

2 -Coefficient of performance of refrigerator and heat pump is always (a) less than unity (b) greater than unity (c) equal to unity (d)None of these

3- Free Expansion is (a) Reversible process (b) an irreversible process (c) polytropic process (d) None of these

4- Process in which entropy remains constant is called (a) Isothermal (b) Adiabatic (c) Isobaric (d) Isochoric

5-Sum of internal energy and term pv is called (a) Specific energy (b)Specific enthalpy (c) Specific entropy (d) Total energy

6-Area under temperature entropy curve (T-s curve) of a thermodynamic process represents (a) heat rejected (b) heat absorbed (c) either heat rejected or absorbed (d) None of these

7-change in internal energy in a closed system is equal to heat transferred if the reversible process takes place at constant (a) pressure (b) temperature (c) volume (d)internal energy

8-the temperature of the system decreases in an ..... (a) adiabatic compression (b) isothermal expansion (c) isothermal compression (d)adiabatic expansion

9-The internal energy of a ideal gas depends on (a) temperature, specific heats and pressure (b) temperature, specific heats and enthalpy (c) temperature, specific heats and entropy (d) temperature only.

10-Which of the following statements is correct according to Clausius statement of second law of thermodynamics ? (a) It is impossible to transfer heat from a body at a lower temperature to a body at a higher temperature (b) It is impossible to transfer heat from a body at a lower temperature to a body at a higher temperature, without the aid of an external source.(c) It is possible to transfer heat from a body at a lower temperature to a body at a higher temperature by using refrigeration cycle (d) None of the above.

11- The true volume of a particular real gas is larger than that calculated from the ideal gas equation. This occurs because the ideal gas equation does NOT correct for: a) the attraction between the molecules (b) the shape of the molecules (c) the volume of the molecules (d) the speed the molecules are moving

12-Entropy change depends on: a) heat transfer (b) mass transfer (c) change of temperature (d) thermodynamic state

Q2- a-A sample of 1.0 mol of a monoatomic ideal gas is taken through a cyclic process of expansion and compression. What will be the value of ΔH for the cycle as a whole?

b- The difference between CP and CV can be derived using the empirical relation $H = U + pV$. Calculate the difference between CP and CV for 10 moles of an ideal gas.

c-Graphically show the total work done in an expansion when the state of an ideal gas is changed reversibly and isothermally from (pi , Vi) to (pf , Vf).

d-Write short notes : The specific work in a reversible adiabatic expansion of an ideal gas, The *thermal efficiency* η of a heat engine(25)

	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF PHYSICS			
	EXAMINATION FOR FRESHMEN (SECOND YEAR) STUDENTS OF PHYSICS &M.SCIENCE & BIOPHYSICS			
	COURSE TITLE:	Vibration and waves (موجات)		COURSE CODE:PH2121
DATE:	29/12/2016	TERM: FIRST	TOTAL ASSESSMENT MARKS: 100	TIME ALLOWED: 2 HOURS

Answer The Following Questions

First Question: (25 Mark)

a) If the equation of motion of a forced oscillator is given by: $\ddot{x} + 2\,\dot{x} + 16\,x = 10\cos(2t)$

Then:

i. The resonance frequency of the velocity is equal to.....

ii. The maximum value of the velocity amplitude is equal to.....

iii. The resonance frequency of the displacement is equal to.....

b) - The equation of motion $m\ddot{x} + sx = 0$ applies to a mass m at the center of a light string of length 2L fixed at both ends under a constant tension T. Show that he stiffness s is equal to $\frac{2T}{L}$ and that $w^2 = 2T/mL$.

Second Question: (25 Mark)

a) If the displacement of a simple harmonic motion of a body of one gram mass is given by:

$x = 5\sin(2t + \frac{\pi}{2})$ then :

i. The amplitude of the motion is equal to.....

ii. The normal frequency is equal to.....

iii. The total energy of the motion is equal to .....

b) - The equation of motion of a forced oscillator is given by $m\ddot{x} + r\dot{x} + sx = F_o e^{iwt}$. Find the steady state displacement and the velocity of the given oscillator.

Third Question: (25 Mark)

a) For damping simple harmonic motion verify that the solution $x = (A + B)e^{-\frac{rt}{2m}}$ satisfies the equation $m\ddot{x} + r\dot{x} + sx = 0$ when $\frac{r^2}{4m^2} = \frac{s}{m}$

b) - Prove that the energy of a simple harmonic oscillator is constant.

Fourth question: (25 Mark)

If x and y are the displacements of a coupled oscillator which made of two identical pendulum each having a mass m suspended on a light rigid rod of length L and connected by a light spring of stiffness s. Discuss and drive expressions for these displacements as a function of time, t.

EXAMINERS	PROF.DR. G.A.GABALLA	

علوم مودد مامزيار

	Tanta University Faculty of Science Physics Department	
	Examination of Level 2 Physics and Material Science Programs	
	Course Title: Electromagnetic Theory I	Course Code: PH2151
	Date:10-1- 2017	1st Semester

The first question (30 marks): -

Put (√) for the right sentences and (x) for the incorrect sentences, then correct it.

1. Gauss's law relates the electric flux through the closed surface to the charge inside it.
2. The divergence theorem relates the volume integral to the closed line integral.
3. The operation on the potential **V** by which **-E** (electric field intensity) is obtained, known as divergence.
4. The work expended in carrying a positive charge in an electrostatic field between two points depends on the path taken between them.
5. The magnitude of **E** is given when the direction of the distance increment is in the same direction of **E**.

The second question: -

a- Prove that in an electric dipole the potential field is proportional to the inverse square of distance and the electric field intensity is proportional to the inverse cube of the distance (**20 marks**).

b- Transform the vector field $\vec{G} = (XZ/Y)\,\vec{a}_y$ in Cartesian coordinate system to a spherical system (**20 marks**).

The third question:-

a- Find the work done in carrying the positive charge q near an infinite line charge: first about a circular path, second about a radial path changing from ρ=a to ρ=b (**25 marks**).

b- If $\vec{E} = (5r * 10^{-5} / \epsilon_o)\,\vec{a}_r$ N/c in the region $r \leq 2$ m in spherical coordinate system, find the volume charge density ρ_v ,then find the net charge q in the region r=2 m (**15 marks**).

The forth question: -

a- Use Gauss's law to find the density of electric flux $\vec{D}$ for infinite sheet with surface charge density ρ_s C/m^2 (**10 marks**)

b- Calculate the energy stored in the electrostatic field in the system consists of three equal charges 4 μc put on the three corners of trigonal with equal sides, each side equal 0.5 mm (**30 marks**).

(ϵ_o is the permittivity of free space = $(1/36\,\pi) * 10^{-9}$ F/m).

1969	TANTA UNIVERSITY FACULTY OF SCIENCE DEPARTMENT OF CHEMISTRY			
	EXAMINATION FOR SECOND YEAR STUDENTS OF MATERIAL SCIENCE.			
	COURSE TITLE:	INSTRUMENTAL ANALYSIS (CREDIT HOURS)		COURSE CODE CH2171
DATE:	JAN, 2017	TERM: FIRST	TOTAL ASSESSMENT MARKS: 150	TIME ALLOWED: 2 HOUR

Answer the following questions:

First question (50 marks)

1. a- Define: Analyte, Matrix, Technique, Accuracy and Precision. (5 marks)

   b- Mention the light sources and detectors that used in the following spectrometers: UV, visible IR and, Luminescence spectrometers. (20 marks)

   c- Drive a straight line equation between:

   i. Total absorbance (A_{total}) and concentration (c) in the standard addition method. (15 marks)

   ii. log T% and concentration (c). log T% on Y axe, (10 marks)

Second question (50 marks)

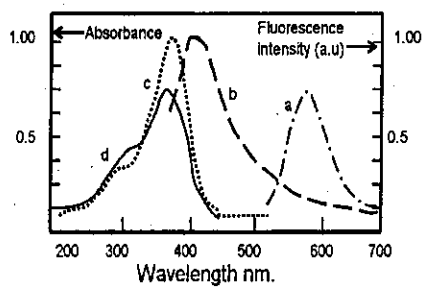
a- Choose, correct curve from the fig.(1) for each case listed. (10 marks)

Note the maximum of absorption and fluorescence spectra are normalized to one (Just write the number of the case and the number of the corresponding curve).

Cases

i. Absorption spectrum curve.
ii. Fluorescence spectrum curve.
iii. Excitation spectrum curve.
iv. Phosphorescence spectrum curve.

Fig.(1)



b- Draw a block diagram of single beam photodiode array spectrometer. (10 marks) .

c- Draw a block diagram of Michelson interferometer. (10 marks)

d- What are the type of changes that occur on the matter by photons of electromagnetic radiation on the following Spectral regions: ESR, Micro-wave, IR, Visible and Ultra-violet. (20 marks)

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