* A - 1 3 4 7 *

A-1347

M. Sc. (Sem. I) Examination

March/April – 2015

Physics : Paper - PH-413

(Measurement & Experimental Planning)

Time : Hours] [Total Marks : **70**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ **M. Sc. (Sem. I)**

Name of the Subject :

☛ **Physics : Paper - PH-413**

☛ Subject Code No. : **1 3 4 7** ☛ Section No. (1, 2,.....) : **Nil**

Seat No. :

Student's Signature

(2) Figures to the extreme right side indicate full marks.

(3) Symbols used have their usual meaning.

(4) Assume data if require.

1 Write the Answer ANY TWO of the following (7x2=14) **14**

(a) Write the basic concepts of measurement and contents of Report. What is the purpose of an abstract?

(b) Discuss on solar radiation. Write short note on detection of thermal radiation.

(c) Define Different types of error. A set of independent current measurements were taken by six observations and were recorded as 12.8A,12.2A,12.5A,13.1A,12.9A and 12.4A. Calculate (a) the arithmetic mean (b) the deviation from the mean, (c) the average deviation, (d) the standard deviation and (e) variance.

2 Write the Answer ANY TWO of the following (7x2=14) **14**

(a) Write function, Constriction and working of Ionization Transducers

(b) Write the desired characteristics of a transducer. Explain the piezoelectric transducer and state its applications.

(c) Define Hall Effect Transducers. A quartz piezoelectric crystal Having a thickness of 2mm and a voltage sensitivity of 0.06 V.m/N is subjected to a pressure of 100 Pisa. Calculate the voltage output.

3 Write the Answer ANY TWO out of three of the following (7x2=14) **14**

(a) (i) Distinguish of different types of pressure gages measurement limits.

(ii) Write the advantages of a well-type manometer and manometer pressure measurement device.

(b) (i) Write short note on Ionization Gage.

(ii) Write the Principal and application of alphatron.

(c) (i) Write the principal of a Mc-leod gage.

(ii) A diaphragm has a= 1.0 in , b= 0.125 in and t=0.048 in and is constructed of spring steel. It is subjected to a total loading of 600 lbf. Calculate the deflection.

4 Write the Answer ANY TWO out of three of the following (7x2=14) **14**

(a) Discuss on Resistance Temperature Detector .What are the advantages and disadvantages of RTD? Write the application of RTD.

(b) (i) Write short note on viscosity measurement system.

(ii) Write the function of Thermocouple .Discuss on Thermocouple compensation.

(c) Define Thermoelectric effect. Calculate the temperature sensitivity for thermistor at $100\,^{\circ}C$. Express the result in ohm-centimeters per degree Celsius: Take $\beta = 4120\,^{\circ}k$. and resistivity $\rho = 110\,\Omega^{-1}$ at 100°c.

5. Write the Answer ANY TWO out of three of the following (7x2=14) **14**

a. (i) Explain theory of strain gages. (ii) What is the main advantage of a semiconductor strain gage?

b. (i) Define strain sensitivity.

(ii) What is the Poisson's ratio?

(iii) Discuss on temperature compensation arrangement for electrical Resistance strain gages.

c. (i) Define Temperature compensation of strain gage.

(ii) A rectangular rosette is mounted on a steel plate having E-29×10^6 Psi and μ =0.3. The three stains are measured as $€_1$=+600 μ in/in, $€_2$=+500 μ in/in $€_3$=–200 μ in/in Calculate the principal strains, stresses and the maximum shear stress. Locate the axis of the principal stress.