

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VII MECHANICAL MECHANICAL :SUMMER- 2022
SUBJECT : EXPERIMENTAL METHODS IN MECHANICAL ENGINEERING

Day : Friday
Date : 3/6/2022

S-17935-2022

Time : 02:30 PM-05:30 PM
Max. Marks : 60

N. B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Use to the non-programmable **CALCULATOR** is allowed.
- 4) Neat diagrams must be drawn **WHEREVER** necessary.
- 5) Assume suitable data if necessary.

Q.1 Discuss statistical measuring theory, with reference to “liquid in glass (10) thermometer” discuss the dynamic characteristics of first order measurements.

OR

A machine shop was assigned the task to manufacture 2000 steel rods of (10) nominal length of 15mm; the rod length was stipulated neither to exceed 15.25 mm and not be smaller than 14.5 mm. when inspected for quality control, it was found that 2000 of the rods were too long to fit into gauge set at 15.25 mm predict the number of remaining 18000 rods. Which will confirm to the specifications presume that the measurement data confirms to Gaussian normal distribution curve.

Q.2 Fit a second degree parabola to the following data by least square method. (10)

X	1929	1930	1931	1932	1933	1934	1935	1936	1937
Y	350	356	357	355	360	361	361	360	358

OR

Obtain a regression plane by using multiple linear regression to fit the data (10) given.

X	1	2	3	4
Y	0	1	2	3
Z	12	20	28	36

Q.3 Explain in detail regression model. Draw and explain plot of residual verses (10) other variables.

OR

What is the need for design of experiment (DOE)? Explain in brief various (10) stages in experimental investigations.

Q.4 Explain the procedure for estimation of error in a multiple variable system (10) using Tayler’s Series Method (TSM).

OR

A resistance arrangement of 50 ohms is desired. Two resistance of (100 ± 0.1) (10) ohms and two resistors (25 ± 0.02) ohms are available. Which should be used: a series arrangement with 30 ohm resistors or a parallel arrangement with the 110 ohm resistor?

P.T.O.

Q.5 With the help of a neat sketch. Explain the principle, working of Orsat apparatus and its applications. **(10)**

OR

What is gas chromatography? How it is used for qualitative and quantitative analysis explain? **(10)**

Q.6 State the basic function of D/A. converter. sketch the block diagram of D/A converter. Explain the different elements and state there functions. **(10)**

OR

State the necessity of data acquisition system present the schematics of such system and point out the function of each element comprising it. **(10)**

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