

Seat No. : _____

SM-106

September-2020

B.Sc., Sem.-VI

311(A) : Physics (Experimental & Measurement Techniques)

Time : 2 Hours]

[Max. Marks : 50

- Instructions :** (1) Attempt **all** questions.
(2) Symbols used have their usual meaning.

Section – I

Attempt any **three** questions :

1. (A) Explain in detail systematic errors arising from experimental design. 7
(B) Explain the rules for determining number of significant figures. 7
2. (A) Show that the mean and the standard deviation of binomial distribution are given by np and \sqrt{npq} respectively. 7
(B) Show that the mean of a poisson distribution is equal to m and variance of a poisson distribution is equal to \sqrt{m} . 7
3. (A) Explain for Transducer characteristics. 7
(B) Write short note on Thermistor. 7
4. (A) Write short note on Thermocouples. 7
(B) Write short note on Semi-conductor Temperature Sensors. 7
5. (A) Explain the construction of a photo-multiplier. 7
(B) Give application of Photodiodes and Photo-transistors. 7

6. (A) Write short note on : Golay Cell 7
 (B) Write short note on : Bolometers 7
7. (A) What is pump speed ? Obtain the equation of the effective pumping speed 7

$$\frac{1}{S_e} = \frac{1}{C} + \frac{1}{S_p}$$

 (B) Write short note on : Turbomolecular pump and Adsorption pump. 7
8. (A) Explain characteristics of vacuum : 7
 (1) Perfect gas law
 (2) Density of molecules
 (3) Mean free path
 (B) Write short note on Capacitance Gauge & Ionization Gauge. 7

Section - II

Attempt any **Four** questions :

(4 × 2 = 8)

9. Answer in short :

- (1) What is accuracy ?
- (2) What is Precision ?
- (3) What is the difference between error and mistake ?
- (4) Write down formula for Gaussian distribution.
- (5) Write down equation for Planck's radiation law.
- (6) Give the value of emissivity of Platinum.
- (7) What is order of Thermocouple output voltage generated ?
- (8) What is activation energy ?

(9) Define frequency.

(10) $100 \text{ MeV} = \underline{\hspace{2cm}}$ J.

(11) Write down equation of Clausius Clapeyron.

(12) Write down formula of Stefan-Boltzmann law.

(13) $200 \text{ m bar} = \underline{\hspace{2cm}}$ torr.

(14) Define mean free path.

(15) Write down equation of average molecular speed.

(16) Define pressure.

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September-2020

B.Sc., Sem.-VI

**311(B) : Physics & Electronics
(Instrumentation)****Time : 2 Hours]****[Max. Marks : 50**

- Instructions :** (1) All questions are compulsory and carry equal marks.
(2) The symbols have their usual meanings.

Section – IAttempt any **three** questions :

1. (A) Give principle of self-generating inductive transducer. Explain construction and working of electromagnetic flowmeter. 7
- (B) What is transducer ? Describe the detail classification of transducer based on various aspects. 7
2. (A) Explain construction and working principle of strain Gauge transducer. What is Gauge factor ? Give advantage of the wire strain Gauge. 7
- (B) Explain construction and working principle of inductive pressure transducer and capacitive pressure transducer. 7
3. (A) Give the difference of digital and analog voltmeter. Give its advantage. Using block diagram explain the working of digital voltmeter. 7
- (B) Give comparison of VOM and VTVM. Explain in detail direct current FET voltmeter. 7

4. (A) What are the measurement standards of instruments ? Explain with proper diagram construction and principle of operation of Basic meter. 7
- (B) Which two points must be kept in mind while measuring voltage across a component in the circuit ? With the proper circuit diagram, explain how basic meter can be converted to D.C. Voltmeter. 7
5. (A) With the help of neat block diagram, explain the operation of function generator. 7
- (B) With the help of neat block diagram, explain the working of AF sine and square wave generator. 7
6. (A) Give classification of the signal generators. Describe the conventional standard signal generator using neat schematic diagram. 7
- (B) Describe with the help of block diagram the operation of the pulse generator. 7
7. (A) Explain the construction and working of LVDT (Linear Variable Differential Transducer). How can LVDT be used to measure pressure ? 7
- (B) What do you mean by electronic voltmeter ? Explain the working of FETVM using neat circuit diagram. 7
8. (A) What are thermocouples ? Explain the construction and working principle of thermocouple. 7
- (B) Write note on piezoelectric transducer and Resistance temperature detectors. 7

Section – II

Attempt any **Four** questions :

9. **Answer in short :**

(4 × 2 = 8)

- (1) Give one name of magnetic transducer.
- (2) The principal disadvantage of piezoelectric transducer is.
- (3) Thermistor is made of.
- (4) Define gauge factor.

- (5) Give the main difference between electronic and electrical instruments.
- (6) Give the unit of current sensitivity of meter.
- (7) What do you mean by loading effect of voltmeter ?
- (8) Sensitivity of $50 \mu\text{A}$ meter movement is
- (9) Square wave generated by pulse generator has a duty cycle.
- (10) Give the use of sweep generator.
- (11) Give the use of function generator.
- (12) AF sine and square wave generator has an output impedance.
- (13) Modulation in modern signal generator is done internally by signals of frequency.
- (14) Write full name of RTD.
- (15) Define analog instrument.
- (16) Define active transducer.

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September-2020

B.Sc., Sem.-VI

311(C) : Physics/Electronics
(Visual Basic)

Time : 2 Hours]

[Max. Marks : 50

- Instructions :**
- (1) All Questions in Section – I carry equal marks.
 - (2) Attempt any Three questions in Section – I.
 - (3) Question 9 in Section - II is Compulsory

Section – I

1. (A) Explain the importance of Visual Basic in Industry. 7
(B) Describe the Data Type variant in VB. 7
2. (A) Explain List box & Combo box in VB. 7
(B) Describe the Edit menu in detail. 7
3. (A) Write a VB script to calculate sum of first 10 natural numbers. 7
(B) Write short note on if-then-else statement in VB. 7
4. (A) Explain Page Setup option in VB. 7
(B) Explain the uses of following : 7
 - (1) For... Next
 - (2) Do....While
5. (A) Write a VB script to prepare a simple calculator. 7
(B) Write a VB script to print any three digit odd numbers. 7

6. (A) Write a note on Global Variable. 7
(B) Explain Radio Button Controls in VB. 7
7. (A) Explain Date and Time Data type in VB. 7
(B) Explain code window and how we execute that window? 7
8. (A) Write note on any one Control statement in VB. 7
(B) Write a VB script to calculate factorial of first 7 numbers. 7

Section – II

9. Attempt any **Eight** :

- (1) Ctrl A is used to erase the data. (True or False)
- (2) Ctrl I is used to bold the data. (True or False)
- (3) Ctrl P is used to open any file. (True or False)
- (4) Ctrl V is used to paste text. (True or False)
- (5) Back Space Key Deletes one character to the right. (True or False)
- (6) Ctrl C to copy any text. (True or False)
- (7) Delete Key Deletes one character to the left. (True or False)
- (8) F10 key Displays the Disassembly dialog box. (True or False)
- (9) _____ is used to check multiple condition.
- (10) _____ is used to assign any values.
- (11) _____ is used to nested condition.
- (12) _____ is the default project name.
- (13) _____ function is used to get result in lower case.
- (14) _____ function is used to get double data.
- (15) _____ function is used to get date.
- (16) _____ command is used to check multiple condition.