

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

$$\frac{1}{S_e} = \frac{1}{C} + \frac{1}{S_p} .$$
 7
 (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 :

9. Answer in short : (4 × 2 = 8)
- (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) $100 \text{ MeV} = \underline{\hspace{2cm}} \text{ J}$.
- (11) Write down equation of Clausius Clapeyron.
- (12) Write down formula of Stefan-Boltzmann law.
- (13) $200 \text{ m bar} = \underline{\hspace{2cm}} \text{ torr}$.
- (14) Define mean free path.
- (15) Write down equation of average molecular speed.
- (16) Define pressure.
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Seat No. : _____

SM-106

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 – I

Attempt 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 μA 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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SM-106

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** : 8
- (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.