

AF-127

April-2016

B.Sc., Sem.-VI

311 : Physics (Elective) (Section – A)
(Experimental and Measurement Techniques)

Time : 3 Hours]

[Max. Marks : 70

- Instructions :** (1) Attempt **all** the questions.
(2) **All** questions carry equal marks.
(3) Symbols used have their usual meaning.

1. (a) Explain the cycle of activities experimental science. 7
OR
Ten repeated measurement simple pendulum of a periodic time are 2.26s, 2.11s, 2.12s, 2.23s, 2.67s, 2.50s, 2.12s, 3.34s, 3.65s, 2.06s. Find out mean value, deviation and standard error in periodic time.
- (b) A current of 5A flow the wire and applied voltage $V=(25+0.10)V$. Find out percentage error in resistance. 7
OR
Discuss about sources of uncertainty.
2. (a) Write a short note on thermistor. 7
OR
Explain transducer characteristics :
(1) Accuracy, (2) Resolution, (3) Repeatability.
- (b) Write a short note on thermocouples. 7
OR
Comparison of temperature Transducer characteristics.
3. (a) Discuss in detail about Rotary pump and Multistage diffusion pump. 7
OR
Write a short note on Pirani gauge and Penning Cold Cathode gauge.
- (b) Explain characteristics of vacuum. 7
OR
What is pump speed ? Obtain the equation of pumping speed.

4. Attempt any **two** questions. **14**
- (1) Gives equation of different types of statistical distribution.
 - (2) Write a short note on Semiconductor thermometers.
 - (3) Explain the Golay cell.
 - (4) Give the application of Photodiodes and Phototransistors.

5. Answer the following short questions. **14**
- (1) What is the dimensional formula of Length ?
 - (2) How many significant figures are in these numbers (a) 0.0036 (b) 4200.00
 - (3) What is probable error ?
 - (4) What is the parent distribution ?
 - (5) What is the meaning of probability ?
 - (6) For given visible spectrum range from 400 nm To 650 nm, find out photon energies range from ___eV To_____eV.
 - (7) Write down equation of Stefan Boltzman's Law.
 - (8) What is Settling Time ?
 - (9) What is a perfect gas ?
 - (10) Give the full form of LED.
 - (11) What is unit of emissivity ?
 - (12) 1mbar_____Pa.
 - (13) Write down equation of the average molecular speed.
 - (14) A Photo detector area light of wavelength 200 nm, find band gap energy of Photo detector.
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B.Sc., Sem.-VI**311 : Physics (Elective)****(Section – B)****(Instrumentation)****Time : 3 Hours]****[Max. Marks : 70**

1. (a) Define transducer. Explain the working of a resistive position (potentiometric) displacement transducer with the help of necessary electrical diagram. Give its advantages and disadvantages. **8**

OR

What is strain gauge ? Narrate its construction, working principle and thereby prove that strain is proportional to ΔR . Give its advantages.

- (b) A metallic strain gauge with $K = 2$ is bonded to a steel member which is subjected to a stress of $10.5 \times 10^9 \text{ N/m}^2$. If modulus of elasticity for steel is $21 \times 10^{12} \text{ N/m}^2$, calculate the fractional change in the resistance of the gauge due to the applied stress. **6**

OR

A 4.5V is applied across two fixed terminals of a potentiometer having length 75 mm and resistance 6K. If the variable terminal divides R (6K) resistance in two parts R_1 and R_2 , what will be the voltage across R_1 if length of R_2 is 25 mm ?

2. (a) Derive the expression for shunt resistor in terms of multiplying factor n to extend the range of a current meter. Calculate the value of shunt resistor R to convert a 10 mA meter with 50Ω internal resistance into a 1 A ammeter. Also find multiplying factor of the shunt. **7**

OR

Derive the expression for series resistance to extend the voltage range of the meter and subsequently derive the equation for voltage multiplication m . A 100 mA meter movement with an internal resistance of 1K is to be used as DC voltmeter of range 50V. Calculate the series resistance required and voltage multiplication m .

- (b) Draw the neat and clean diagram of basic meter movement and explain the construction and principle of operation with the help of it. **7**

OR

Explain with a suitable example how the reading of a voltmeter is affected due to its loading to the circuit across which voltage is being measured.

3. (a) (1) Name the oscillator circuits used in signal generator according to their frequency range of generation and voltage wave shape they generate. **6**
(2) Name the different frequency bands with their approximate frequency range.

OR

Draw the neat and clean block diagram of standard signal generator and explain its working with the help of it.

- (b) Draw the neat and clean block diagram of laboratory type square and pulse generator and explain its working with the help of it. **8**

OR

What is function generator ? Draw its block diagram and explain its working with the help of it.

4. (a) Draw the electric circuit for ohm meter. Explain its working and show why its scale is non-linear. **7**

OR

Draw the block diagram of AF sine and square wave generator and random noise generator.

- (b) Draw the diagram of LVDT and explain its construction and working. **7**

OR

What are seebeck effect and thermocouple ? Explain the working of thermocouple as a transducer.

5. Answer in short : **14**

- (1) Give the name of any one biological transducer.
- (2) Give the name of any one voltage generating type transducer.
- (3) Give the difference between photovoltaic and photoconductive devices.
- (4) Give the name of different types of photoconductive device.
- (5) Calculate sensitivity of a 50 μ A meter movement.
- (6) What is VTVM ?
- (7) What do you mean by full scale deflection current (I_m) ?
- (8) Draw the output voltage waveform of a full wave rectifier type AC meter.
- (9) Why is a soft iron cylinder kept between moving coil ?
- (10) Give the difference between pulse and square wave.
- (11) Define duty cycle.
- (12) What is rise time and fall time of a pulse ?
- (13) Which circuit can generate sinusoidal waveform from non-sinusoidal waveform ?
- (14) Why are different impedance connections in the output of signal generator given ?

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April-2016

B.Sc., Sem.-VI

**311 : Electronics (Elective)
(Modern Communication)**

Time : 3 Hours]

[Max. Marks : 70

- Instructions :** (1) All questions carry equal marks.
(2) Symbols used here have their usual meaning.
(3) Figures to the right indicate marks.

1. (a) Draw the block diagram of Telephone System & Telephone Set. Explain Hybrid Circuit. 7

OR

Explain BORSCHT functions in the Subscriber Interface with block diagram.

- (b) Explain the Cordless Phone Features, Capabilities and Limitations. 7

OR

With a PBX block diagram explain Private Telephone System.

- 2 (a) Define Multiple Access. Explain Frequency Reuse, FDMA & TDMA. 7

OR

Explain Cellular Telephone System with the help of Cellular Concepts.

- (b) Draw the block diagram of the AMPS & describe its operational procedure. 7

OR

Describe GPRS & EDGE in detail. What makes EDGE faster than GPRS ?

3. (a) List the main applications of Internet and describe them briefly. 7

OR

Write a note on Storage Area Networks with block diagram.

- (b) Explain Internet transmission systems. Explain Frame Relay & ATM with block diagram. 7

OR

Discuss Internet Backbone with block diagram.

4. (a) Explain types of networks in detail. 7

OR

Explain types of Wireless LANs with block diagram.

- (b) Explain star topology & ring topology with block diagram. 7

OR

Describe how repeaters & hubs are used in LAN with block diagram.

5. Answer the following : 14

- (1) What is Switch Hook ?
 - (2) Define : Local Eoop
 - (3) Give full form of PABX.
 - (4) Give full form of SDMF.
 - (5) What is AMPS ?
 - (6) What is MIN ?
 - (7) Give full form of CDMA.
 - (8) What is HSUPA ?
 - (9) Give the full form of GPRS.
 - (10) Give full form of VoIP.
 - (11) What is http ?
 - (12) What is UDP ?
 - (13) Define : Network
 - (14) What is Router ?
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April-2016

B.Sc., Sem.-VI

311 : Physics/Electronics (Elective)

(Visual Basic)

(Section – C)

Time : 3 Hours]

[Max. Marks : 70

1. (A) Explain First Screen of Visual Basic. 7
OR
Explain Implicit Type Declaration in VB.
- (B) Define the term Project Explorer & Form designer. 7
OR
Explain Text Box & Label control in VB.
2. (A) Write short note on If.. .then. ..else statement. 7
OR
Write a VB script to print first 100 natural numbers.
- (B) Explain Cut, Copy and Paste options in VB. 7
OR
Explain New, Open and Close options in VB.
3. (A) Write a VB script to print any two digit even numbers. 7
OR
Write a VB script to calculate sum of first 100 numbers.
- (B) Explain Date and Object Data Type in VB. 7
OR
Explain Print and Dim statement in VB with example.
4. (A) Write a VB script to prepare a simple calculator. 7
OR
Explain View menu in VB.

(B) Write a VB script to calculate factorial of first 5 numbers.

7

OR

Write note on For loop in VB.

5. Answer in short .

14

- (1) Default VB file name.
 - (2) Default Extension of VB file .
 - (3) Default form name in VB.
 - (4) How we make duplicate file in VB ?
 - (5) Write short cut key to save any file.
 - (6) How we find any Text in VB ?
 - (7) Write short cut key to print any project.
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