

2020/TDC(CBCS)/ODD/SEM/  
PHSSEC-501T/159

( 2 )

TDC (CBCS) Odd Semester Exam., 2020  
held in March, 2021

PHYSICS

( 5th Semester )

Course No. : PHSSEC-501T

( Basic Instrumentation Skills )

*Full Marks : 50*  
*Pass Marks : 20*

*Time : 3 hours*

*The figures in the margin indicate full marks  
for the questions*

SECTION—A

Answer the following as directed (any *fifteen*) :  
1×15=15

1. Define sensitivity in measurements.
2. What is the resolution range in measurements?
3. Write one significance of a multimeter.
4. What is relative error in measurements?

10-21/147

( Turn Over )

5. Define loading effect.
6. Write one cause of poor precision in scientific measurements.
7. What is rectifier?
8. The resistance of an ideal voltmeter is
  - (a) low
  - (b) high
  - (c) infinite

(Choose the correct option)

9. Electronic voltmeters are designed to measure
  - (a) only very small voltage
  - (b) only very high voltage
  - (c) both very small and high voltages

(Choose the correct option)

10. The range of electronic voltmeter can be extended by using
  - (a) functional switch
  - (b) input attenuator
  - (c) rectifier

(Choose the correct option)

10-21/147

( Continued )

( 3 )

**11.** The input impedance of an electronic voltmeter is

- (a) low
- (b) high
- (c) medium
- (d) zero

(Choose the correct option)

**12.** The sensitivity of an electronic voltmeter is very high.

(Write True or False)

**13.** CRO is used for the measurement of

- (a) AC as well as DC current
- (b) AC current only
- (c) DC current only

(Choose the correct option)

**14.** In a radio application, CRO is used for measuring

- (a) audio frequency range
- (b) a narrow range of frequencies
- (c) a wide range of frequencies
- (d) radio frequency range

(Choose the correct option)

( 4 )

**15.** In medical application, CRO can be used for

- (a) measuring the heartbeats
- (b) monitoring the brain
- (c) displaying cardiograms

(Choose the correct option)

**16.** A CRO cannot be used in transmission lines.

(Write True or False)

**17.** If the negative potential on the control grid of a CRT is increased the intensity of the spot

- (a) is increased
- (b) is decreased
- (c) remains same

(Choose the correct option)

**18.** Rays emitted by a cathode ray tube are

- (a) lights
- (b) radiations
- (c) signals
- (d) electrons

(Choose the correct option)

( 5 )

19. Define  $Q$ -factor.
20. What is a  $Q$ -meter?
21. State the principle of working of a  $Q$ -meter.
22. In a series  $R$ - $L$ - $C$  circuit operating above the resonant frequency, the current
- (a) lags the applied voltage
  - (b) leads the applied voltage
  - (c) is in phase with the applied voltage
- (Choose the correct option)
23. What is the use of a pulse generator?
24. Which bridge is used for the measurement of inductance?
25. Output of a digital multimeter is
- (a) mechanical
  - (b) optical
  - (c) electrical
- (Choose the correct option)
26. What is the basic difference between analog and digital instruments?

( 6 )

27. The range of a digital voltmeter is
- (a) 1 V to 1 MV
  - (b) 1 V to 1 kV
  - (c) 1 kV to 1 MV
- (Choose the correct option)
28. What is frequency counter?
29. What is timebase stability?
30. A quantity having discrete numerical value is
- (a) an analog quantity
  - (b) a digital quantity
  - (c) a binary quantity
- (Choose the correct option)

SECTION—B

Answer any *five* of the following questions :  $2 \times 5 = 10$

31. What are the basic specifications of a multimeter?
32. Distinguish between accuracy and precision.
33. Explain two advantages of an electric voltmeter over conventional voltmeter.

( 7 )

34. What is the difference between rectifier and amplifier?
35. State the basic working principle of CRO.
36. Which two CRO controls can be used together to obtain sharp and fine display pattern?
37. What is the impedance at the resonant frequency of a series  $R-L-C$  circuit with  $L = 20 \text{ mH}$ ,  $C = 0.02 \text{ F}$  and  $R = 90 \text{ } \Omega$  ?
38. What is the significance of a capacitor in Maxwell bridge?
39. Define the following parameters of digital meter :
  - (a) Accuracy
  - (b) Sensitivity
40. Name the basic building block of digital multimeter.

SECTION—C

Answer any *five* of the following questions :  $5 \times 5 = 25$

41. Explain the principles of measurements of a.c. voltage and a.c. current with the help of multimeter.

10-21/147

( Turn Over )

( 8 )

42. Explain how you will measure d.c. voltage, d.c. current and resistance with the help of a multimeter.
43. Draw the block diagram of a.c. millivoltmeter and state its significance.
44. Explain the specification and significance of an electronic voltmeter.
45. Draw the labelled block diagram of CRO and state the functions of each block.
46. Explain the four basic parts of CRT.
47. Draw a labelled block diagram of a pulse generator with explanation and state its function.
48. Explain with block diagram the working principle of  $R-L-C$  bridge. Also state its specification.
49. Explain with block diagram the working of a digital multimeter.
50. State the characteristics and working of a digital voltmeter.

\*\*\*

2020/TDC(CBCS)/ODD/SEM/  
PHSSEC-501T/159

10-21—280/147