



M.Sc. I Semester Degree Examination, April / May - 2024

PHYSICS

Skill Enhancement Course (SEC)

**Design of Electrical and Electronics Circuits
(NEP)**

Time : 1 Hour

Maximum Marks : 30

Note : Answer *all* the question.

1. _____ term describes the degree of closeness of a measured value to the true value.
(A) Accuracy (B) Precision
(C) Sensitivity (D) Resolution
2. Which of the following instruments measures electrical current ?
(A) Ammeter (B) Voltmeter
(C) Ohmmeter (D) Wattmeter
3. The SI unit of resistance is :
(A) Ampere (B) Ohm
(C) Volt (D) Watt
4. What type of filter is used to pass certain frequencies while attenuating others ?
(A) Active filter (B) High-pass filter
(C) Band-stop filter (D) Passive filter
5. Which component stores electrical energy in an electric field ?
(A) Resistor (B) Capacitor
(C) Transistor (D) Diode
6. What term describes the opposition to the flow of alternating current in a circuit ?
(A) Resistance (B) Conductance
(C) Reactance (D) Impedance



7. What is the formula for calculating the total impedance in a series RLC circuit ?
- (A) $Z = R + \frac{1}{j\omega L} + j\omega C$ (B) $Z = R + j\omega L - \frac{1}{j\omega C}$
- (C) $Z = R - j\omega L + \frac{1}{j\omega C}$ (D) $Z = R + j\omega L + \frac{1}{j\omega C}$
8. When setting up a circuit for measuring resistance, why is it essential to disconnect the circuit from the power source ?
- (A) To avoid damaging the multimeter
(B) To ensure safety during circuit assembly
(C) To prevent overheating of the resistors
(D) To improve the accuracy of resistance measurements
9. What is the main cause of errors in measurements due to the instrument itself ?
- (A) Loading effects (B) Environmental conditions
(C) Instrument accuracy (D) Human error
10. What type of circuit element does not oppose the change in current flowing through it ?
- (A) Resistor (B) Capacitor
(C) Inductor (D) Diode
11. What type of motor runs on direct current (DC) ?
- (A) AC motor (B) Brushless motor
(C) Stepper motor (D) DC motor
12. Which of the following is a component commonly used to control the speed of a DC motor ?
- (A) Capacitor (B) Diode
(C) Thyristor (D) Resistor
13. How can you interface a DC source to control a heater effectively ?
- (A) By using a rectifier (B) By employing a voltage regulator
(C) By utilizing a relay (D) By employing a solid-state switch



14. What type of modulation is commonly used to control the speed of a DC motor ?
(A) Amplitude modulation (AM)
(B) Frequency modulation (FM)
(C) Pulse-width modulation (PWM)
(D) Phase modulation (PM)
15. Which motor type operates on alternating current (AC) ?
(A) DC motor
(B) Stepper motor
(C) Synchronous motor
(D) Induction motor
16. What is the primary function of a rectifier in interfacing an AC source to control a motor ?
(A) To convert AC to DC
(B) To regulate voltage
(C) To provide isolation
(D) To switch the motor on/off
17. Which component is commonly used to convert PWM signals into analog voltage for motor control ?
(A) Operational amplifier
(B) Zener diode
(C) Schottky diode
(D) Light-emitting diode (LED)
18. In DC motor modelling, what does PWM stand for ?
(A) Pulse-Width Modulation
(B) Power Waveform Modulation
(C) Phase Width Manipulation
(D) Power Wave Manipulation
19. Which type of motor requires a commutator for its operation ?
(A) Brushless DC motor
(B) AC induction motor
(C) Synchronous motor
(D) Brushed DC motor
20. What is the primary advantage of using PWM for DC motor control ?
(A) Improved efficiency
(B) Lower cost
(C) Higher torque
(D) Smoother operation
21. Which programming language is commonly used for scientific computing and data analysis ?
(A) Python
(B) Java
(C) C++
(D) Ruby
22. What type of wave has a periodic, sine-like shape ?
(A) Square wave
(B) Triangle wave
(C) Sinusoidal wave
(D) Sawtooth wave
23. Which electronic component exhibits a nonlinear relationship between voltage and current ?
(A) Resistor
(B) Capacitor
(C) Inductor
(D) Diode



24. What is the primary function of an LDR (Light Dependent Resistor) ?
- (A) To store electrical energy
 - (B) To regulate voltage
 - (C) To change resistance based on light intensity
 - (D) To convert AC to DC
25. What is the primary purpose of an ExpEyes Kit in the course ?
- (A) To measure cooking ingredients
 - (B) To control room temperature
 - (C) To interface with virtual labs
 - (D) To study electrical and electronic components
26. Which of the following is NOT a common source of electrical power ?
- (A) Battery
 - (B) Solar panel
 - (C) Piezoelectric crystal
 - (D) Radio antenna
27. What is the characteristic curve of a diode called ?
- (A) Hysteresis
 - (B) I-V curve
 - (C) R-L curve
 - (D) C-V curve
28. What type of circuit involves both resistance (R) and capacitance (C) ?
- (A) RC circuit
 - (B) RL circuit
 - (C) LC circuit
 - (D) LC circuit with Battery
29. What type of kit is ExpEyes commonly referred to as ?
- (A) Robotics kit
 - (B) Sensor kit
 - (C) Oscilloscope kit
 - (D) Electronic experimentation kit
30. Which software tool is often used for numerical computing, simulation and data visualization in engineering ?
- (A) Python
 - (B) MATLAB
 - (C) C#
 - (D) HTML

