

**Ph.D. Entrance Examination**  
**November- 2022**  
**Part - C**  
**(Electronics and Communication Engineering)**  
**Time : 50 Minutes**  
**Maximum Marks : 50**

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**Note :**

- (i) This question booklet comprises of 50 questions.
  - (ii) All questions are compulsory.
  - (iii) The question booklet along with answer sheet is to be handed over by the candidate to the Invigilator at the end of the examination.
  - (iv) There is no negative marking.
  - (v) Each question carries one mark.
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**Multiple Choice Questions -**

- 1. \_\_\_\_\_ is defined as any physical quantity that varies with time, space or any other independent variable
  - (a) Signal
  - (b) System
  - (c) Signals & system
  - (d) None of the above
- 2. A signal is a power signal when the signal has
  - (a) Infinite average power
  - (b) Finite average power
  - (c) Zero average power
  - (d) None of the above
- 3. \_\_\_\_\_ is defined as the increment in the input of the instrument for which the output remains constant
  - (a) Resolution
  - (b) Sensitivity
  - (c) Fidelity
  - (d) Lag
- 4. \_\_\_\_\_ provides different types of waveforms such as sine, triangular, square, pulse etc at the output
  - (a) Oscillator
  - (b) Signal generator
  - (c) DC Tachometer generator
  - (d) None of the above.
- 5. Which of the following device has characteristics closed to that of an ideal current source?
  - (a) Gas diode
  - (b) Crystal diode
  - (c) Transistor in CB mode
  - (d) All of the above

6. Which of the following material is used for infra-red LED's?
- (a) Gallium arsenide (b) Calcium phosphide  
(c) Silicon (d) None of the above
7. A Zener diode
- (a) Has a high forward-voltage rating  
(b) Has a sharp breakdown at low reverse voltage  
(c) Is useful as an amplifier  
(d) Has a negative resistance
8. The power consumption of LEDs may be of the order of
- (a) 5 to 10 nano amperes (b) 5 to 10 micro amperes  
(c) 5 to 10 milliamperes (d) 5 to 10 amperes
9. A triac is like a
- (a) Unidirectional SCR (b) Bidirectional SCR  
(c) NPN transistor (d) PNP transistor
10. Which of the following device has negative resistance?
- (a) Gas diode (b) Vacuum diode (c) Tunnel diode (d) None of the above
11. A tunnel diode is used for
- (a) Very low frequencies (b) 50 Hz  
(c) HF (d) Microwave frequencies
12. In a power supply a shorted input capacitor is likely to result in
- (a) Excessive hum (b) Reduced voltage output  
(c) No voltage output (d) None of the above
13. PN-junction is heavily doped in case of
- (a) PIN diodes (b) Tunnel diodes (c) Gun diodes (d) All of the above
14. A semi-conductor diode when tested with ohmmeter gives low value of R in both directions, herefore it can be concluded that
- (a) The diode is shorted  
(b) The diode is open  
(c) The diode is satisfactory  
(d) Nothing can be concluded on the basis of information provided

15. The depletion or space-charge region in a junction diode contains charges that are
- (a) Mostly majority carriers                      (b) Mostly minority carriers  
(c) Mobile donor and acceptor ions              (d) Fixed donor and acceptor ions
16. As compared to mercury arc rectifiers, mental rectifiers
- (a) Can operate at high loads                      (b) Can operate on high voltages  
(c) Operate on low temperatures                  (d) Give poor regulation
17. In a power supply with normal ac input if there is no  $V^+$  output, the trouble could be with
- (a) Rectifier    (b) Open filter choke  
(c) Excessive hum                                      (d) None of the above
18. The dc output voltage is 40 V at full load and 41 V without any load current. The load regulation is.
- (a) 0.24%                      (b) 0.48%                      (c) 0.96%                      (d) 2.40%
19. For a SCR typical gate trigger voltage is
- (a) 0.2 V                      (b) 6 V                      (c) 60 V                      (d) 600 V
20. The rms value will be
- (a) 0.707 ym                      (b) 0.636 ym                      (c) 0.5 ym                      (d) 0.316 ym
21. The ideal characteristic of a stabilizer is
- (a) Constant output voltage with low internal resistance  
(b) Constant output with low internal resistance  
(c) Constant output voltage with high internal resistance  
(d) Constant internal resistance with variable output voltage
22. A pure semiconductor behaves like an insulator at 0K because
- (a) There is no recombination of electrons with holes  
(b) Drift velocity of free electrons is very small  
(c) Free electrons are not available for current conduction  
(d) Energy possessed by electrons at that low temperature is almost zero
23. A crystal diode is used as a
- (a) A. rectifier                      (b) Amplifier                      (c) Oscillator                      (d) Any of the above

24. A tunnel diode
- (a) Has a small tunnel in its junction
  - (b) Is a point contact diode with a high reverse resistance
  - (c) Is a gallium arsenide device
  - (d) Is a highly doped P-N junction device
25. When bias applied to a var-cap diode is increased its capacitance
- (a) When heated, their light output tends to shift to shorter wavelength
  - (b) They have rapid turn-on and turn-off times
  - (c) Their response times are about 5 nanoseconds
  - (d) They emit lights of different wavelengths varying infra-red to green
26. The minimum number of diodes needed for a bridge rectifier is
- (a) Eight
  - (b) Four
  - (c) Two
  - (d) One
27. In LED, light is emitted because
- (a) Light falls on LED
  - (b) Diode emits light when heated
  - (c) Recombination of charges takes place
  - (d) Any of the above
28. Which of the following is a passive component?
- (a) Vacuum tube devices
  - (b) Capacitors
  - (c) Semiconductor devices
  - (d) All of the above
29. The depletion layer of a P-N junction diode has
- (a) Only free mobile holes
  - (b) Only free mobile electrons
  - (c) Both free mobile holes as well as electrons
  - (d) Neither free mobile electrons nor holes
30. An ideal voltage regulator has a voltage regulation of
- (a) 1
  - (b) 100
  - (c) 50
  - (d) 0
31. In a feedback series regulator circuit, the output voltage is regulated by controlling the
- (a) Magnitude of input voltage
  - (b) Gain of the feedback transistor
  - (c) Reference voltage
  - (d) Voltage drop across the series pass transistor
32. The output voltage of a step-down type switching voltage regulator depends on
- (a) Input voltage
  - (b) Duty cycle
  - (c) Transistor on-time
  - (d) All of the above
33. A crystal diode has
- (a) One pn junction
  - (b) Two pn junctions
  - (c) Three pn junctions
  - (d) None of the above

34. The d.c. resistance of a crystal diode is \_\_\_\_ its a.c. resistance  
(a) The same as      (b) More than      (c) Less than      (d) None of the above
35. The knee voltage of a crystal diode is approximately equal to  
(a) Applied voltage      (b) Breakdown voltage  
(c) Forward voltage      (d) Barrier potential
36. When the graph between current through and voltage across a device is a straight line, the device is referred to as  
(a) Linear      (b) Active      (c) Nonlinear      (d) Passive
37. Mains a.c. power is converted into d.c. power for  
(a) Lighting purposes      (b) Heaters  
(c) Using in electronic equipment      (d) None of the above
38. The PIV rating of each diode in a bridge rectifier is \_\_\_\_ that of the equivalent centre-tap rectifier.  
(a) One-half      (b) The same as      (c) Twice      (d) Four times
39. The maximum efficiency of a half-wave rectifier is  
(a) 40.60%      (b) 81.20%      (c) 50%      (d) 25%
40. The capacitance of a varactor diode increases when reverse voltage across it  
(a) Decreases      (b) Increases      (c) Breaks down      (d) Stores charge
41. When the reverse voltage increases, the junction capacitance  
(a) Decreases      (b) Stays the same      (c) Increases      (d) Has more bandwidth
42. In an unregulated power supply, if load current increases, the output voltage  
(a) Remains the same      (b) Decreases      (c) Increases      (d) None of the above
43. A power supply which has a voltage regulation of is unregulated power supply.  
(a) 0%      (b) 0.50%      (c) 10%      (d) 0.80%
44. As the junction temperature increases, the voltage breakdown point for zener mechanism  
(a) is increased      (b) is decreased      (c) remains the same      (d) None of the above
45. The correct full wave rectifier circuit is  
(a) The edge of the depletion region on the p-side  
(b) The edge of the depletion region on the n-side  
(c) The p+ n junction  
(d) The centre of the depletion region on the n-side

46. In the normal operation of an SCR, anode is \_\_\_\_\_ w.r.t. cathode.  
(a) At zero potential (b) Negative (c) Positive (d) None of the above
47. A power supply has a voltage regulation of 1%. If the no-load voltage is 20V, what is the full-load voltage?  
(a) 20.8 V (b) 15.7 V (c) 18.6 V (d) 17.2 V
48. If firing angle in an SCR circuit is increased, the output  
(a) Remains the same (b) Is increased (c) Is decreased (d) None of the above
49. An SCR can exercise control over of a.c. supply.  
(a) Positive half-cycles only (b) Negative half-cycles only  
(c) Both positive and negative half-cycles (d) Positive or negative half-cycles
50. We can control a.c. power in a load by connecting  
(a) Two SCRs in series (b) Two SCRs in parallel  
(c) Two SCRs in parallel opposition (d) None of the above

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