Ph.D. COMMON ENTRANCE TEST AUGUST 2024

SUBJECT – ELECTRONICS ENGINEERING

PART B

Roll No:	

Duration: 60 minutes **Maximum Marks: 50**

Instructions:

1. **This entrance test question paper is not to be taken out of the examination hall**
2. **Question paper consists of Section A and Section B**
3. **Section A consists of 30 MCQs carrying 1 Mark each. Write the Alphabet of the correct answer in the space given.**
4. **Section B consists of Descriptive questions carrying 5 marks each. Restrict your answer to 500 words. Additional plain sheets have been attached to the question paper to answer Section B**

SECTION – A

Answer the following questions by writing the Alphabet of the correct answer in the Box given: **30 X 1 = 30**

PART A

1. Which of the following should a microcontroller at-least should consist of?

a) CPU, ROM, I/O ports, and timers
b) RAM, ROM, I/O ports, and timers
c) CPU, RAM, I/O ports, and timers
d) CPU, RAM, ROM, I/O ports, and timers

2. What type of semiconductor is used in LED electronic circuits?

a) Intrinsic semiconductor
b) Compound semiconductor
c) Degenerated semiconductor
d) Compensated semiconductor

3. Ohm's law is applicable to which of the following

a) semi-conductors
b) vaccum tubes
c) electrolytes
d) none

4. For a voltage source to be neglected, the terminals across the source should be _____
a) replaced by inductor
b) short circuited
c) replaced by some resistance
d) open circuited

5.The type of systems which are characterized by input and the output quantized at certain levels are called as
a) analog
b) discrete
c) continuous
d) digital

6.The general form of real exponential signal is_____
a) X (t) = beat
b) X (t) = (b+1)eat
c) X (t) = b (at)
d) X (t) = be (a+1)t

7 Impulse response is the output of _____ system due to impulse input applied at time=0?
a) Linear
b) Time varying
c) Time invariant
d) Linear and time invariant

8 What are the conditions called which are required for a signal to fulfil to be represented as Fourier series?
a) Dirichlet's conditions
b) Gibbs phenomenon
c) Fourier conditions
d) Fourier phenomenon

9.The resultant signal obtained after frequency convolution along with constant multiplier 12πj of the signals whose Laplace transforms are given by, 1s+2 and 1s+1.
a) e-2t + e-t
b) e-2t
c) e-3t
d) e-t

10 Which of the following is the correct relationship between temperature (T) and mobility (u) of electrons in electronic circuits?
a) u ∝ T-3/2
b) u ∝ T-1/2
c) u ∝ T
d) u ∝ T-1

11 In which of the following region does BJT act as the amplifier electronic device?
a) Cut-off
b) Saturation
c) Active
d) Reverse saturation

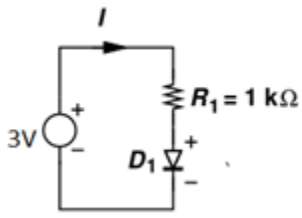
12 An electronic circuit wire of conductivity 5.8 × 107 mho-m is subjected to an electric field of 40 mV/m. What will be its current density?
a) 2.32 × 106 A/m2
b) 1.16 × 106 A/m2
c) 4.64 × 106 A/m2
d) 4.30 × 106 A/m2

13 Which of the following is the correct expression of current in an intrinsic semiconductor electronic circuit?
a) ITotal = Ie + Ih
b) ITotal = Ie – Ih
c) ITotal = Ie + 2Ih
d) ITotal = 2Ie + Ih

14 Which of the following diode is used in ultra-high speed switching electronic circuits?
a) Zener diode
b) Varactor diode
c) Tunnel diode
d) Schottky diode

15 Which of the following is the correct order of turn-off times?
a) MOSFET < BJT < IGBT < SCR
b) MOSFET < IGBT < BJT < SCR
c) SCR < BJT < IGBT < MOSFET
d) BJT < MOSFET < IGBT < SCR

16 The current I through the circuit if we consider diode in ideal diode model.



a) 3mA
b) 3A
c) 1A
d) 0.4mA

17 The equation Jn=qnμnE (A/cm2) represents_____
a) Drift current
b) Drift current density
c) Diffusion current
d) Diffusion current density

18 DC average current of a center taped full wave rectifier is _____
(Where I_m is the maximum peak current of input)
a) 2Im/π
b) Im/π
c) Im/2π
d) 1.414Im/π

19 Which of the following is not true regarding clamper?
a) A positive clamper adds a positive DC voltage
b) A clamper can also be called as a re-inserter
c) To reduce tilt, reduce the RC value
d) Negative clamper will clamp the positive peak of output to the reference voltage

20 In a diode, the change in voltage being applied across it is 2V. The change in minority carriers Outside the depletion region is 1.2×10-8. Find diffusion capacitance.
a) 6 pF
b) 6 μF
c) 1.2 nF
d) 6nF

21 Which gates in Digital Circuits are required to convert a NOR-based SR latch to an SR flip-flop?
a) Two 2 input AND gates
b) Two 3 input AND gates
c) Two 2 input OR gates
d) Two 3 input OR gates

22 How must the output of a gate in a TTL digital circuit act when it is HIGH?
a) Acts as a voltage source
b) Acts as a current sink
c) Acts as a current source
d) Acts as a voltage sink

23 Frequency components of an AM wave are?
a) Carrier frequency (ωc) with amplitude A
b) Lower side band (ωc + ωm) having amplitude mA⁄2
c) Upper side band (ωc – ωm) having amplitude mA⁄2
d) Carrier frequency (ωc/2) with amplitude A

24 Which effect is characteristic of FM reception in a noisy environment?
a) threshold effect
b) capture effect
c) bessel effect
d) carson's effect

25 What is the use of pre-emphasis?
a) to increase the signal to noise ratio for higher audio frequencies
b) to allow stereo audio to be carried by FM stations
c) to increase the signal to noise ratio for all audio frequencies
d) to increase the signal to noise ratio for lower audio frequencies

26 Find a vector normal to a plane consisting of points p1(0,1,0), p2(1,0,1) and p3(0,0,1)
a) –j – k
b) –i – j
c) –i – k
d) –i – j – k

27 Find the force between 2C and -1C separated by a distance 1m in air(in newton).
a) 18 X 106
b) -18 X 106
c) 18 X 10-6
d) -18 X 10-9

28 The work done by a charge of 10μC with a potential 4.386 is (in μJ)
a) 32.86
b) 43.86
c) 54.68
d) 65.68

29 The microprocessor of a computer can operate on any information if it is present in _____ only.
a) Program Counter
b) Flag
c) Main Memory
d) Secondary Memory

30 The Reciprocity theorem can be applied to the circuits having
a) Linear elements
b) Non-Linear elements
c) Dependent sources
d) Semiconductor elements

Section - B

Answer any four questions (Each question carry 5 marks 4*5 = 20

1.Discuss the difference between AM, FM, and PM.

2. Discuss at least five basic performance parameters of IC voltage regulators. Mention the various ways theses parameters affect the overall system performance.

3.a) Compare Transient and steady-state analysis of LTI systems

b) Justify how Routh-Hurwitz and Nyquist Criterion assist in determination of stability of a control system

4. What is the voltage V_S across the open switch in the circuit shown in Fig. 1?

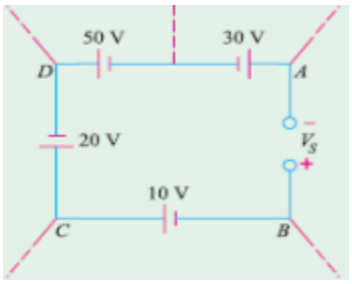


Fig.1

5. Define signum function and explain the need for its conversion.

6. Explain in detail classification of signals with real time examples