

School of studies in Electronics and Photonics
Pandit RavishankarShukla University, Raipur (C.G.)
Entrance Test 2022
UGC & AICTE approved two year postgraduate Course
M. Tech. in Optoelectronics & Laser Technology

Date – xx/xx/2022

Time: xx:xx xx to xx:xx xx

Maximum Marks: 50

INSTRUCTIONS TO CANDIDATES

1. Immediately after the commencement of the examination, you should check that this test booklet does not have any unprinted or torn or missing pages or items. If so get it replaced immediately by a complete test booklet.
2. You have to enter your Roll number on the Test Booklet in the box provided. Do not write anything else on the test booklet except the space provided for rough work.
3. This test booklet contains 50 questions. Each question of one mark comprises four responses (answers). You will select the response which you want to mark on the Answer Sheet. In case you feel that there are more than one correct answer, mark the answer which you consider the best. In any case, ONLY ONE response for each question should be marked.
4. You have to mark all your answers ONLY on the separate Answer Sheet.
5. This Examination Paper MUST NOT be taken out from the Examination Room.
6. Before you proceed to mark in the Answer Sheet, you have to fill some particulars in the answer sheet as per instructions.
7. There is NO NEGATIVE marking for incorrect answers.
8. If a candidate gives more than one answer, it will be treated as a wrong answer even if one of the given answers happens to be correct.
9. During an exam, you must not have in your possession, a book, notes, paper, calculator, pencil case, or other material/item which has not been authorized for the exam or specifically permitted as noted below. Any material or item on your desk, chair or person will be deemed to be in your possession. You are reminded that possession of unauthorized materials in an exam is a discipline offence.
10. Candidates are reminded that they should have no material on their desks unless its use has been specifically permitted by the following instructions.
11. Use of electronic calculators is not allowed.
12. Fill in your answers in the Answer Book and return both Answer Book & Test Booklet.

Office Use Only

Maximum Marks	Correct Answers	Marks Obtained
50		

Signature of Evaluator

M. Tech. in Optoelectronics & Laser Technology Entrance Test 2022

Candidates must complete this section

Candidate Roll No.: _____ Candidate signature with date: _____

Invigilator signature with date: _____

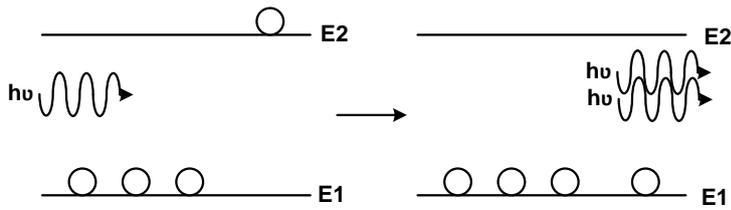
Time: One hour

Max Marks: 50

MULTIPLE CHOICE QUESTIONS (1 MARK PER QUESTION)

1. Why npn transistors are preferred over pnp transistors?
 - (a) Leakage current in npn transistors is less than pnp transistors
 - (b) Mobility of majority carrier in npn transistors is greater than the mobility of majority carrier in pnp transistors
 - (c) Bias voltage required in npn is less than in pnp transistors
 - (d) Bias voltage required in npn is greater than in pnp transistors
 2. What is the chemical bonding in silicon semiconductor?
 - (a) Metallic
 - (b) Ionic
 - (c) Covalent
 - (d) Van der waals
 3. Which of the following laws do not form a Maxwell equation ?
 - a) Planck's Law
 - b) Gauss's Law
 - c) Faraday's Law
 - d) Ampere's Law
 4. For an insulating material, the dielectric strength and dielectric loss should be respectively
 - a) High and high
 - b) High and low
 - c) Low and high
 - d) Low and low
 5. Optical fibers are used in
 - a) CAT scan
 - b) X-ray photos
 - c) Ultrasound scans
 - d) Endoscopy
 6. n – type silicon is obtained by doping silicon with
- a) Germanium
 - b) Aluminium
 - c) Boron

- d) Phosphorus
7. Negative feedback in an amplifier
- a) Reduces gain
 - b) Increases frequency and phase distortion
 - c) Reduces bandwidth
 - d) Increases noise
8. The number of distinct Boolean expressions of 4 variables is
- a) 16
 - b) 256
 - c) 1024
 - d) 65536
9. Thin gate oxide in a CMOS process is preferably grown using
- a) Wet oxidation
 - b) Dry oxidation
 - c) Epitaxial deposition
 - d) Ion implantation
10. The modes of propagation supported by a circular wave guide is:
- a) TM, TEM, TE modes
 - b) TM, TE
 - c) TM, TEM
 - d) TE, TEM
11. Optical fiber operates on the principle of
- (a) Total internal reflectance
 - (b) Tyndall effect
 - (c) Photo-electric effect
 - (d) Laser technology
12. When a beam of light enters one medium from another, which quantity will not change?
- a) Direction
 - b) Speed
 - c) Frequency
 - d) Wavelength
13. In Photodiodes dark current is mainly because of
- a) Thermally generated electron hole pair
 - b) External applied electric Field
 - c) Incident light
 - d) None of the above
14. The following graph is pictorial representation of _____



- a) Spontaneous emission
- b) Spontaneous Absorption
- c) Stimulated emission
- d) Stimulated Absorption

15. Which of the following pulse communication system is inherently immune to noise
- a) PWM
 - b) PPM
 - c) PCM
 - d) PAM
16. The Darlington emitter-follower circuit is sometimes used in the output stage of a TTL gate in order to
- a) Increase its I_{OL}
 - b) Reduce its I_{OL}
 - c) Increase its speed of operation
 - d) Reduce its power dissipation
17. The present output Q_n of an edge triggered JK flip flop is logic 0. If $J = 1$, then Q_{n+1}
- a) Cannot be determined
 - b) will be logic 0
 - c) Will be logic 1
 - d) Will race around
18. The absorption coefficient of semiconductor materials is strongly dependent on -----
- a) Properties of material
 - b) Wavelength
 - c) Amount of light
 - d) Amplitude
19. Solar cell works on the principle of
- (a) Isolation and opto coupling
 - (b) Isolation
 - (c) Opto coupling
 - (d) Photovoltaic
20. _____ is the science and technology of generating, controlling, and detecting photons, which are particles of light.
- A. Photoelectronics
 - B .Photonics
 - C. Optonic
 - D. None of the above
21. An operational amplifier possesses
- a) Very large input impedance and very large output impedance
 - b) Very large input impedance and very small output impedance
 - c) Very small input impedance and very large output impedance
 - d) Very small input impedance and very small output impedance

22. The effective channel length of a MOSFET in saturation decreases with increase in
- Gate voltage
 - Drain voltage
 - Source voltage
 - Body voltage
23. Which of the following can be used for the generation of Laser pulse?
- Ruby Laser
 - Carbon dioxide Laser
 - Helium Neon Laser
 - Nd-YAG Laser
24. OLED stands for _____.
- orange light-emitting device
 - organic light-emitting diode
 - organic light-emitting disc
 - None of the above
25. Introducing a resistor in the emitter of a common emitter amplifier stabilises the dc operating point against variations in
- Only the temperature
 - Only the β of the transistor
 - Both temperature and β
 - None of the above
26. A 0 to 6 counter consists of 3 flip flops and a combinational circuit of 2 input gate(s). The combinational circuit consists of
- One AND Gate
 - One OR Gate
 - One AND Gate and one OR Gate
 - Two AND Gates
27. In Euler's formula of Fourier series, find b_n if the function $f(x) = x^2$.
- finite value
 - infinite value
 - zero
 - can't be found
28. Faraday's law of electromagnetic induction is mathematically described by which one of the following equations?
- (A) $\nabla \cdot \vec{B} = 0$ (B) $\nabla \cdot \vec{D} = \rho_v$
- (C) $\nabla \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$ (D) $\nabla \times \vec{H} = \sigma \vec{E} + \frac{\partial \vec{D}}{\partial t}$
29. What types of sources are required for Young's Double Slit experiment?
- Coherent
 - Incoherent
 - Intense
 - Bright
30. Consider the following statements in connection with the biasing of semiconductor diodes

1. LEDs are used under forward biased condition
2. Photodiodes are used under forward biased condition
3. Zener diodes are used under reverse biased condition
4. Variable capacitance diodes are under reverse biased condition

Which of these statements are correct?

- a) 1,2 and 3
- b) 1,2 and 4
- c) 2,3 and 4
- d) 1,3 and 4

31. If a signal $f(t)$ has energy E , the energy of the signal $f(2t)$ is equal to
 a) E b) $E/2$ c) $2E$ d) $4E$

32. Phase velocity of waves propagating in a hollow metal waveguide is
 a) Greater than velocity of light in free space
 b) Less than the velocity of light in free space
 c) Equal to the velocity of light in free space
 d) Equal to the group velocity

33. The divergence of which quantity will be zero?
 a) E
 b) D
 c) H
 d) B

34. In the equilibrium state, the thermodynamic probability of system is.....?
 a) zero b) maximum c) minimum but not 1 d) one

35. What type of two optical sources are generally used in Fibre optic systems?
 a) LEDs and APDs
 b) PIN diodes and LEDs
 c) LEDs and Laser diodes
 d) Laser diodes and APDs

36. Which of the following is three-level Laser?
 a) ND-YAG b) Ruby c) He-Ne d) Semiconductor Laser

37. Which color appears at the top when white light is incident on a glass prism?
 a) Violet b) Indigo c) Red d) Yellow

38. What does the following graph show?

46. Fiber optic communication systems typically operate in what three wavelength windows?
- a) 400 nm, 850 nm, and 1550 nm
 - b) 400 nm, 900 nm, and 1550 nm
 - c) 850 nm, 1300 nm, and 1550 nm
 - d) 1300 nm, 2000 nm, and 4000 nm
47. Which thing is more dominant in making a fiber function as a bidirectional optical amplifier?
- a) Core material
 - b) Pump source
 - c) Cladding material
 - d) Diameter of fiber
48. Which of the following is used for the formation of holograms ?
- a) X-ray
 - b) Visible Light
 - c) Infrared
 - d) Lasers
49. In circulator, an optical path of a signal follows -----
- a) An open-loop
 - b) A closed loop
 - c) Both (a) and (b)
 - d) None of the above
50. ----- alloys can be fabricated in hetero-junction structures -
- a) InGaSb
 - b) III – V alloys
 - c) InGaAsP
 - d) GaAsSb

Space for rough work