

Code No.

L – 4047

**Entrance Examination for Admission to the M.Tech. Courses in the
Teaching Departments, 2021**

CSS

**ELECTRONICS & COMMUNICATION (OPTOELECTRONICS AND
OPTICAL COMMUNICATION)**

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General Instructions

1. The Question Paper is having two Parts — Part 'A' Objective type (60%) & Part 'B' Descriptive type (40%).
2. Objective type questions which carry 1 mark each are to be (✓) 'tick marked' in the response sheets against the appropriate answers provided.
3. 8 questions are to be answered out of 12 questions carrying 5 marks each in Part 'B'.
4. **Negative marking** : 0.25 marks will be deducted for each wrong answer in Part 'A'.

Time : 2 Hours

Max. Marks : 100

To be filled in by the Candidate									
Register Number	in Figures								
	in words								

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PART – A

(Objective Type)

Choose appropriate answer from the options in the questions. **One mark each.**

(60 × 1 = 60 marks)

1. Permanent magnets are materials with
 - a) High coercivity, Low retentivity
 - b) Low coercivity, Low retentivity
 - c) High coercivity, High retentivity
 - d) Low coercivity, High retentivity

DO NOT WRITE HERE

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2. Vibrational energy of molecules resonates with
- | | |
|---------------|---------------|
| a) Radio wave | b) Micro wave |
| c) IR wave | d) UV wave |
3. Unit of Q-factor is
- | |
|------------------|
| a) Ohm |
| b) Ampere |
| c) Volt |
| d) None of these |

15. The central spot in the Newton's ring is
- a) bright
 - b) rectangular
 - c) dark
 - d) coloured
16. A long wire carries a steady current is bent into a circle of one turn and the magnetic field at the centre is B . It is then bent into coil of n turns. The magnetic field at the centre of the coil is
- a) nB
 - b) n^2B
 - c) $2nB$
 - d) $2n^2B$
17. The ratio of electric field vector and magnetic field vector has the dimension of
- a) voltage
 - b) resistance
 - c) capacitance
 - d) inductance
18. The power dissipation of a Silicon diode with I_g of 40mA is
- a) 28W
 - b) 28mW
 - c) 280mW
 - d) 2.8W
19. The coefficient of reflectivity of a perfect black body is
- a) 0
 - b) 1
 - c) infinity
 - d) 100
20. A gas does 4.2J of external work during adiabatic expansion if its temperature falls by 2K. Its internal energy
- a) increase by 4.2J
 - b) decrease by 4.2J
 - c) remains constant
 - d) decrease by 2.2J

28. Fullerene is made up of
- a) Carbon atoms
 - b) Germanium atoms
 - c) Silicon atoms
 - d) Sodium atoms
29. Fibre optics communication uses the phenomenon of
- a) transmission
 - b) reflection
 - c) interference
 - d) total internal reflection
30. The digital logic family that exhibits lowest power consumption is
- a) CMOS
 - b) TTL
 - c) PMOS
 - d) NMOS
31. The operation used in push-pull amplifier circuit is
- a) Class A
 - b) Class B
 - c) Class C
 - d) Class AB
32. The point of intersection of d.c load line and a.c load line is
- a) cut-off point
 - b) saturation point
 - c) operating point
 - d) ideal point
33. The ripple frequency of a full wave rectifier operated with a single phase supply frequency of 50Hz is
- a) 25 Hz
 - b) 50 Hz
 - c) 100 Hz
 - d) 200 Hz

34. A voltage follower
- a) has a gain of unity
 - b) has no feedback resistor
 - c) is non-inverting
 - d) all of the above
35. Three amplifier stages each with a voltage gain of 10 are cascaded. The net gain is
- a) 10
 - b) 30
 - c) 300
 - d) 1000
36. The feedback used in Wien bridge oscillator is
- a) Positive
 - b) Negative
 - c) Both positive and negative
 - d) No feedback
37. Sweep generator in CRO works on the principle of
- a) Inductor
 - b) Capacitor
 - c) Diode
 - d) Resistor
38. The decimal equivalent of the octal number $(645)_8$ is
- a) $(450)_{10}$
 - b) $(421)_{10}$
 - c) $(451)_{10}$
 - d) $(501)_{10}$

39. Comparators are used in
- a) Memory
 - b) CPU
 - c) Motherboard
 - d) Hard-drive
40. A basic SR flip-flop can be constructed by Cross-coupling of
- a) AND or OR
 - b) XOR or XNOR
 - c) NOR or NAND
 - d) None of the above
41. The value of $A+1$ in Boolean algebra is
- a) 1
 - b) 0
 - c) A
 - d) None of these
42. The TV transmission tower has a height of 200m. By how much the height of tower be Increased to triple its coverage range.
- a) 1600 m
 - b) 1800 m
 - c) 800 m
 - d) 600 m
43. The 16 bit registers in 8085 microprocessor is/are
- a) Stack pointer
 - b) Program counter
 - c) Both (a) and (b)
 - d) Accumulator
44. The NOP instruction in 8086 processor introduces
- a) Address
 - b) Memory
 - c) Reset
 - d) Delay

45. The e.m.f. induced when a conductor of length 0.2m. moves in a magnetic field of 5T with a velocity of 0.3m/s
- a) 0.3V
 - b) 0.03V
 - c) 30V
 - d) 3V
46. The unit of magnetic flux is
- a) Weber
 - b) Maxwell
 - c) Weber/m²
 - d) Both (a) and (b)
47. A substance that changes its electrical resistance when illuminated by light is
- a) Photovoltaic
 - b) Photoelectric
 - c) Photoconductive
 - d) None of these
48. A dipole antenna is an example of
- a) Wire antenna
 - b) Aperture antenna
 - c) Array antenna
 - d) None of these
49. The orbit of communication satellite is
- a) Elliptical
 - b) Hyperbolic
 - c) Circular
 - d) Parabolic
50. The logic gate that gives high output only if the inputs are same is
- a) NOR
 - b) XOR
 - c) XNOR
 - d) NAND

51. At 0K intrinsic semi - conductors behave as
- a) Conductors
 - b) Super conductors
 - c) Semi-conductors
 - d) Insulators
52. Which of the following is used to study the wave nature of electrons is
- a) Stern – Gerlach experiment
 - b) Davisson Germer experiment
 - c) Hertz experiment
 - d) Rutherford scattering experiment
53. Which one of the following is a Fermion?
- a) Photon
 - b) Meson
 - c) Electron
 - d) α -particle
54. The input control parameter of JFET is
- a) Source voltage
 - b) Gate voltage
 - c) Drain voltage
 - d) Gate current
55. In CsCl crystal Cs occupies the corners and Cl occupies the body centre. The crystal structure is
- a) Body centred cubic
 - b) Simple cubic
 - c) Face centred cubic
 - d) All of the above

ANSWER SHEET — PART — A

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E
14	A	B	C	D	E
15	A	B	C	D	E
16	A	B	C	D	E
17	A	B	C	D	E
18	A	B	C	D	E
19	A	B	C	D	E
20	A	B	C	D	E

21	A	B	C	D	E
22	A	B	C	D	E
23	A	B	C	D	E
24	A	B	C	D	E
25	A	B	C	D	E
26	A	B	C	D	E
27	A	B	C	D	E
28	A	B	C	D	E
29	A	B	C	D	E
30	A	B	C	D	E
31	A	B	C	D	E
32	A	B	C	D	E
33	A	B	C	D	E
34	A	B	C	D	E
35	A	B	C	D	E
36	A	B	C	D	E
37	A	B	C	D	E
38	A	B	C	D	E
39	A	B	C	D	E
40	A	B	C	D	E

41	A	B	C	D	E
42	A	B	C	D	E
43	A	B	C	D	E
44	A	B	C	D	E
45	A	B	C	D	E
46	A	B	C	D	E
47	A	B	C	D	E
48	A	B	C	D	E
49	A	B	C	D	E
50	A	B	C	D	E
51	A	B	C	D	E
52	A	B	C	D	E
53	A	B	C	D	E
54	A	B	C	D	E
55	A	B	C	D	E
56	A	B	C	D	E
57	A	B	C	D	E
58	A	B	C	D	E
59	A	B	C	D	E
60	A	B	C	D	E

ELECTRONICS & COMMUNICATION (OPTOELECTRONICS AND OPTICAL COMMUNICATION)

PART – B

(Descriptive Type)

Answer **any eight** questions.

(8 × 5 = 40 Marks)

1. Derive the wave equation for an electromagnetic wave from Maxwell's equations.
2. Discuss the propagation of light through an optical fiber. Distinguish between step index fiber and graded index fiber.
3. Explain the principle and working of LED.
4. What is population inversion? Explain how this is achieved in lasers.
5. What is Raman effect? Explain quantum theory of Raman effect.
6. What is superconductivity? Explain few important applications.
7. Discuss the classification of elementary particles.
8. With a neat diagram explain the working of RC phase shift oscillator.
9. Explain the working of master slave JK flip-flop.
10. Arrive at the expression for the band width in Young's double slit experiment.
11. Explain the working of Zener diode as a voltage regulator.
12. With a neat diagram, briefly discuss the internal architecture of 8085 microprocessor.

