

**FACULTY OF ENGINEERING**  
**B.E. (ECE) VI - Semester (AICTE) (Backlog) Examination, March / April 2022**  
**Subject: Optical Communications**  
**Professional Elective – I**

Time: 3 Hours

Max. Marks: 70

(Missing data, if any, may be suitably assumed)

**PART – A**

Note: Answer all questions.

(10 x 2 = 20 Marks)

1. Draw the schematic of a single fiber structure and explain it.
2. Define Meridional rays and skew rays.
3. When  $6 \times 10^6$  photons at a wavelength of 1300nm fall on an InGaAs photo detector, on the average  $5.4 \times 10^6$  electron-hole pairs are generated. What is the quantum efficiency?
4. Define responsivity.
5. List out various direct and indirect band gap materials.
6. Write about quantum laser.
7. What are fiber splices?
8. Discuss the propagation modes of single and multi mode fibers.
9. Compare step index and graded index fiber structures.
10. What is Avalanche multiplication noise?

**PART – B**

Note: Answer any five questions.

(5 x 10 = 50 Marks)

11. (a) Write short notes on modes in cylindrical wave guide fiber.  
(b) A multimode step index fiber with a core diameter of  $80\mu\text{m}$  and a relative refractive index difference of 1.5% is operating at a wavelength of 850nm. If the core refractive index is 1.48, estimate  
(i) 'v' number or normalized frequency (ii) The number of guided modes.
12. (a) Write detailed notes on linear and nonlinear scattering in optical fibers.  
(b) A step index fiber of core radius and index are  $5\mu\text{m}$  and 1.46 respectively. If refractive index fractional difference is 0.01, then find the numerical aperture and the maximum operating frequency for single mode propagation.
13. (a) Draw the cross section of Ga Al As double hetero structure LED, energy band diagram and refractive index variation. Explain their importance.  
(b) Compare the merits and demerits of LED and ILD as sources of optical signals.
14. Explain the principle and construction of reach through APD with a neat sketch.
15. Explain link power budget and system rise time budget analysis.
16. (a) What is the need for a pre-amplifier and explain about its different types.  
(b) Discuss in detail the evolution of fiber optic system.
17. Write short notes on:  
(a) Wavelength Division Multiplexing.  
(b) Erbium Doped Fiber amplifier.

**FACULTY OF ENGINEERING**  
**B.E. (ECE) VI - Semester (AICTE) (Backlog) Examination, March / April 2022**  
**Subject: IoT Sensors**  
**Professional Elective - I**

**Time: 3 Hours**

**Max. Marks: 70**

**(Missing data, if any, may be suitably assumed)**

**PART – A**

**Note: Answer all questions.**

**(10 x 2 = 20 Marks)**

- 1 Write any four protocols at application layer.
- 2 How is M2M technology differ from IoT?
- 3 Define Sensor and Actuator.
- 4 What is the importance of smart sensors?
- 5 What is IoT device? Give any two.
- 6 What is LoRaWAN? It is so popular. Why?
- 7 Mention different serial communication standards.
- 8 What are the requirements of cloud interface?
- 9 How can you monitor the noise pollution at particular area?
- 10 What is smart grid?

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

- 11 (a) Explain the different devices and gateways in IoT technology.  
(b) List out the differences between LAN and WAN.
- 12 Mention various capacitive element based sensors. Explain its working principle in detail.
- 13 Draw and explain the internal architecture of Arduino. Mention its advantages.
- 14 Mention the different external communication interfaces. Describe any two interfaces in detail.
- 15 What are the different sensors used for health and lifestyle? Explain atleast one application related health in detail.
- 16 Describe and differentiate the important specifications of Raspberry Pi, Beagle Bone black and pcDuino.
- 17 Write short notes on any two:
  - (a) Data Management
  - (b) Surface Acoustic Wave Sensor
  - (c) Thing Speak IoT platform.

**FACULTY OF ENGINEERING**

**B.E. (MECH/PROD) VI - Semester (AICTE) (Backlog) Examination,  
March / April 2022**

**Subject: Production and Operations Management**

**Time: 3 hours**

**Max. Marks: 70**

**(Missing data, if any, may be suitably assumed)**

**PART – A**

**Note: Answer all questions**

**(10 x 2 = 20 Marks)**

- 1 How do you classify production systems?
- 2 List the factors to be considered for the selection of plant location.
- 3 Outline the advantages of work study.
- 4 Differentiate between method study and time study.
- 5 Define forecasting and classify its methods.
- 6 What are the main objectives of aggregate planning?
- 7 Define MRP II.
- 8 Define the following: (i) Critical path (ii) Slack
- 9 What is meant by cost slope of an activity?
- 10 List out the assumptions used in flow shop scheduling.

**PART – B**

**Note: Answer any five questions**

**(5 x 10 = 50 Marks)**

- 11 a) Define plant layout and discuss about product layout.  
b) Discuss the different principles of plant layout in the industry.
- 12 a) Describe briefly the procedure to be followed for time study by stop watch method.  
b) Define standard time of an operation. List its various uses.
- 13 a) Explain the predetermined time study approach to work measurement.  
b) Briefly discuss about work sampling.
- 14 Determine trend values by method of least squares. Also estimate the annual sales for 1993.

Years	1988	1989	1990	1991	1992
Sales in Lakhs of Rs.	45	56	78	46	75

- 15 a) Discuss in detail MRP system by defining its inputs and outputs.  
b) Discuss the principles of motion economy.
- 16 Determine the length and variance of the critical path for the project.

Activities	1-2	1-6	2-3	2-4	3-5	4-5	6-7	5-8	7-8
$t_o$	3	2	6	2	5	3	3	1	4
$t_m$	6	5	12	5	11	6	9	4	19
$t_p$	15	14	30	8	17	15	27	7	28

- 17 Write short notes on the following:
  - i) Features of ERP packages
  - ii) Common errors in drawing networks
  - iii) Symbols in method study.

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**FACULTY OF ENGINEERING**

**B.E. (A.E) VI - Semester (CBCS) (Backlog) Examination, March / April 2022**

**Subject: Material Handling and Earth Moving Vehicles (Pro. Ele.- I)**

**Time: 3 Hours**

**Max. Marks: 70**

**(Missing data, if any, may be suitably assumed)**

**PART – A**

**Note: Answer all questions.**

**(2 x 10 = 20 Marks)**

1. Identify the difficulties in Manual Handling.
2. Enlist the various types of Conveying equipment's.
3. How the Rollers are classified?
4. What is Half Gantry Crane?
5. Write the uses of Rippers?
6. Mention any four Off- road vehicles.
7. Differentiate between Mechanical Grader & Hydraulic Grader.
8. When and where Fork lift trucks are used.
9. What is Dipper Stick?
10. Write the advantages and disadvantages of Cable Belt Conveyor.

**PART – B**

**Note: Answer any five questions.**

**(5 x 10 = 50 Marks)**

11. (a) Describe the factors considered for a selecting a Material Handling System.  
(b) Write a brief outline on Belt and Chain conveyors?
12. Explain about the EOT- Cranes with neat sketches.
13. Briefly explain about the Land-clearing operations and Explain their type of equipment's used.
14. (a) Write a short note on Hydraulic Mechanism of Hydraulic Shovel.  
(b) Explain the Hydraulic Motor working principle.
15. What are the major components of Dump Trucks? Explain them in detail.
16. Discuss the role of tractors in earth moving what considerations govern solution of wheel type or crawler type tractor on a job? Compare the application of two types of tractors.
17. Write short notes on:
  - (a) Bulldozer.
  - (b) Wheeled and Crawler tractor.
  - (c) Shovels and Ditchers.