

10 AUG 2023

Reg. No.

Question Paper Code

12132

**B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2023**

First Semester

**Civil Engineering**

(Common to All Branches except Computer Science and Business Systems)

**20BSPH101 - ENGINEERING PHYSICS**

(Regulations 2020)

Duration: 3 Hours

Max. Marks: 100

**PART - A (10 × 2 = 20 Marks)**

Answer ALL Questions

- |   | <i>Marks,<br/>K-Level, CO</i> |
|---|-------------------------------|
| 1. What are Bravais Lattices?   | 2,K1,CO1                      |
| 2. Define atomic radius.  | 2,K1,CO1                      |
| 3. What is population inversion?  | 2,K1,CO2                      |
| 4. What are the basic components of Laser?  | 2,K2,CO2                      |
| 5. What is meant by attenuation?  | 2,K2,CO3                      |
| 6. Distinguish between step-index and graded-index fibers.  | 2,K2,CO3                      |
| 7. What are the applications of I-shape girders?  | 2,K2,CO4                      |
| 8. A copper wire of 3 m length and 1 mm diameter is subjected to a tension of 5 N. Calculate the elongation produced in the wire if the Young's modulus of elasticity of copper is 120 GPa. | 2,K2,CO4                      |
| 9. What is bimetallic strip? Give its use.  | 2,K2,CO6                      |
| 10. State the principle of solar water heater.  | 2,K2,CO6                      |

**PART - B (5 × 13 = 65 Marks)**

Answer ALL Questions

11. a) What are Miller indices? Derive an expression for the inter-planar spacing for (h k l) planes of a cubic structure. 13,K2,CO1
- OR**
- b) Explain the two melt growth techniques. 7,K2,CO1
- (a) Czocharalski's method. 6,K2,CO1
- (b) Bridgeman method.
12. a) Outline the principle, construction and working of a CO<sub>2</sub> laser. 13,K2,CO2
- OR**
- b) Derive Einstein's relation for atomic transitions and hence deduce the expressions for Einstein's coefficient. 13,K2,CO2

K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze; K5 – Evaluate; K6 – Create

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13. a) Derive expressions for the acceptance angle and numerical aperture. 13,K2,CO3

**OR**

b) Explain the losses in optical fibers. 13,K2,CO3

14. a) What is cantilever? Obtain expression for the depression at the loaded end of cantilever whose other end is fixed as summing that its own weight is not effective in bending. 13,K2,CO4

**OR**

b) (i) Explain stress – strain diagram for ductile material. 8,K2,CO4

(ii) Explain factors affecting elasticity. 5,K2,CO4

15. a) Describe Forbe's method to determine thermal conductivity of metals with relevant theory and experiment. 13,K2,CO6

**OR**

b) Derive expression for effective thermal conductivity through compound media in series and parallel. 13,K2,CO6

**PART - C (1 × 15 = 15 Marks)**

16. a) Derive Schrodinger's wave equation for a particle in a box. Solve it to obtain Eigen function and show that Eigen values are discrete. 15,K2,CO5

**OR**

b) Derive Planck's law for blackbody radiation and hence deduce Wien's displacement law and Rayleigh– Jean's law. 15,K2,CO5