

S.No. 3229

P 16 PY 11

(For candidates admitted from 2016-2017 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Physics

MATHEMATICAL PHYSICS

Time : Three hours

Maximum : 75 marks

PART A — ($10 \times 2 = 20$)

Answer ALL questions.

1. What is scalar fields?
2. Define surface integral.
3. What is Eigen vectors.
4. Define mixed tensor
5. What is sub group?
6. Define space group.
7. What is meant by singularities?
8. Write about Cayley's integral theorem.

9. What is Beta function?

10. Give the Laguerre differential equation.

PART B — ($5 \times 5 = 25$)

Answer ALL questions, choosing either (a) or (b)

11. (a) Explain the physical significance of a curl of a vector function? Give examples.

Or

(b) State and explain Gauss divergence theorem.

12. (a) Explain about the characteristic equation of the matrix.

Or

(b) State and explain Quotient law.

13. (a) Differentiate the homomorphism and isomorphism.

Or

(b) Explain the formation of character table.

14. (a) Derive the Cauchy's integral theorem.

Or

(b) Explain the Laurent's series.

15. (a) Explain any three Recurrence relation of Legendre polynomial Rodrigue's formula.

Or

(b) Discuss the generating function of Bessel's polynomial.

PART C — ($3 \times 10 = 30$)

Answer any THREE questions.

16. Verify stokes theorem for the vector field $A = (3x - 2y)i + x^2zj + y^2(z + 1)k$ for a plane rectangular area with vertices at (0.0), (1.0), (1.2), (0.2) in the x-y plane,

17. Discuss the reduction of a matrix to diagonal form.

18. Explain the reducible and irreducible representation using scherr's formula.

19. Discuss about Cauchy's integral theorem and Cauchy's integral formula.

20. Describe the recurrence relation of Bessel function.