DPHY01

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019
PHYSICS
First Year
Mathematical Physics

Time : 3 Hours   **Maximum Marks : 70**

<u>Answer any Five questions</u>
<u>All question carry equal marks</u>

Q1) Obtain the series solution of Hermite differential equation.

Q2) a) Obtain the generating function for Lagurre polynomial.
     b) Show that

Q3) a) Obtain the cauchy - Riemann equations.
     b) Define analytic function and show that is non - analytic any where

Q4) a) State and explain Taylor's theorem.
     b) Expand in a Laurent series valid for

Q5) a) Explain the classification of cartesian tensors.

     b) Write a note on symmetric and antisymmetric tensors.

Q6) a) Obtain the covariant derivatives of tensor.

     b) Obtain the Laplacian operator in Riemann Space.

Q7) a) Explain the first and second shifting theorems of Laplace Transform.

     b) Show that

Q8) a) Obtain the FT of delta function.

     b) Find the FT of

Q9) Write any Two of the following :

     a) Show that .

     b) State and explain cauchy's integral formula.

     c) Write a note on Associated tensors.

     d) Half - wave expensions.

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DPHY02

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019
PHYSICS
First Year
Classical Mechanics and Statistical Mechanics

Time : 3 Hours   **Maximum Marks : 70**

Answer any five questions from the following

Q1)   a)   State and explain principle of virtual work.

     b)   Derive Lagranges equation from Hamilton's principle.

Q2)   a)   Explain the rate of charge of a vector in a   moving frame of reference.

     b)   Explain the Torque free motion of rigid body.

Q3)   a)   Obtain the Lagrangian formulation of relativistic mechanics.

     b)   Write a note on canonical transformations

Q4)   a)   Obtain the Hamilton - Jacobi equations from Hamilton's principle.

     b)   Explain the frequencies of free vibration and normal coordinates.

Q5)   a)   State and explain equipartition theorem.

     b)   What is Gibb's paradax? How it can be resolved?

Q6)   a)   Explain the energy fluctuations in canonical   ensemble.

     b)   Obtain the equivalence between the canonical ensemble and grand canonical ensemble.

Q7)   a)   Explain the postulates of quantum statistical mechanics.

     b)   Explain the classical limit of the partition function and variational principle.

Q8)   a)   Explain the theory of white dwarf stars.

     b)   Write a note on Bose - Einstein condensation.

Q9)   Answer any Two of the following :

     a)   Cyclic coordinates.

     b)   Lagrange and poisson brackets.

     c)   Density fluctuational in grand canonical ensemble.

     d)   Darwin Fowlar method.

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DPHY03

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019

(First Year)
PHYSICS
Quantum Mechanics

Time : 3 Hours   **Maximum Marks : 70**

Answer any Five questions
All questions carry equal marks

Q1)   a)   Explain the difference between classical and quantum mechanics and explain the functions and operators.

      b)   Explain the degenerate Eigen functions and discuss the degree of degeneracy.

Q2)   a)   Explain the Eigen functions of computing operators and related theorems.

      b)   State and explain uncertainty principle.

Q3)   a)   Obtain the solution of wave equation for particle moving in one dimension in a constant potential field with finite walls.

      b)   Explain the stark effect in hydrogen atom.

Q4)   a)   Explain the ground state of Helium atom using variation method.

      b)   Explain WKB method.

Q5)   a)   Define angular momentum operator and obtain the computation relations.

      b)   Obtain the explicit matrices for J_x, J_y and J_z.

Q6)   a)   Obtain Clesbach Gordon coefficients.

      b)   State and explain Wigner- Eekart theorem.

Q7)   a)   Obtain the equations of motion in Schrodinger's picture.

      b)   Obtain the Klein Goodon equation to hydrogen atom.

Q8)   a)   Explain Dirac matrices.

      b)   Obtain the Dirac's equation in the presence of Electromagnetic field.

Q9)   Write notes on any <u>Two</u> of the following :

      a)   Time dependent wave equation for a rigid rotator.

      b)   Einstein Transition probabilities.

      c)   Pauli's spin matrices.

      d)   Negative energy states.

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DPHY04

M.Sc. DEGREE EXAMINATION, JUNE/JULY - 2019
First Year
PHYSICS
Electronics

Time : 3 Hours   **Maximum Marks : 70**

Answer any Five questions
All questions carry equal marks

Q1) a) Explain how Op-Amp can be used as inverting and non-inverting amplifier.
     b) Explain the effect of feed back on closed loop gain and input resistance.

Q2) a) Explain the working of phase sly oscillator.
     b) Explain the operation of class AB amplifier.

Q3) a) Explain the TEM wave in the coaxial line resonant cavities.
     b) Explain the operation of Magnetron.

Q4) a) Define frequency modulation and explain the production of FM waves.
     b) Explain the working of superheterodyne receiver.

Q5) a) State and explain Demorgen theorems.
     b) Explain the working of multiplexer encoder.

Q6) a) Explain the working of Master Slave flip-flop and D-Flip-flop.
     b) Explain A/D and D/A conversion.

Q7) a) Explain the instruction set of 8085.
     b) Write an ALP for subtraction of two 8 bit numbers.

Q8) a) Explain the architecture of 8086.
     b) Explain the addressing modes of 8086.

Q9) Write any <u>Two</u> of the following :
     a) CMRR.
     b) TV transmission and reception.
     c) Sample and hold circuits.
     d) Addressing modes of 8085.

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