Time: Three hours   Maximum: 70 marks

SECTION- A
ANSWER ALL THE QUESTIONS: **(06X05=30)**

1. .(a) What do you mean by generalized coordinates ?.**(OR)**

    (b) Explain the principle of least action.

2.(a) Derive the equation of motion from Poisson brackets. **(OR)**

    (b)Describe   action angle variables for systems one degree of freedom.

3.(a) Find the elements of the rotation matrix in terms of the Euler angles. **(OR)**

    (b) Derive angular momentum and kinetic energy of rigid body

4. (a)Discuss about the Lorentz transformations.**(OR)**

    (b) Explain the covariant four dimensional formula

5. (a) Write the basics postulates of special theory relativity **(OR)**

    (b) Derive the Mass energy equivalences..

Answer any four Questions only   SECTION-B   (4 x 10= 40)

6.With relevant theory derive an expression for the mechanics of a system of a particle.

7. Starting from D'Alembert's principle derive the equation of motion of   Lagrange.

8. Discuss the torque- free motion of a symmetrical rigid body on the basis of Euler's equation of motions.

9.What are action angle variables? Discuss the keplar problem in action angle variables.

10.Give an account of motion of symmetric top under gravity.

11.Derive the Lagrangian and Hamiltonian formulation of relativistic mechanics.

12.Short notes on (a) length contraction (b) time dilation (c) velocity addition formula.

13.Derive the Lagrangian equation from Hamilton's principle.

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VINAYAKA MISSIONS RESEARCH FOUNDATION, SALEM

(Deemed to be University)

M.Sc.(PHYSICS) DEGREE EXAMINATION - November 2018

First Semester

DSC – II MATHEMATICAL PHYSICS

Time: Three hours   Maximum: 70 marks

PART – A   (5 x 6 = 30)

(Answer ALL Questions)

1**.** A) State and prove Laurent series for complex variables .   (Or)
   B) With the help of calculus of residuces , evaluate integral $_{-\infty}\int^{\infty}(\cos(px)-\cos(qx)) / x^2$ dx.

2**.** A) What is known as similarity transformation? Show that the trace of a matrix remains
        invariant under this transformation.   (Or)
   B) Define the Kronecker delta symbol? And discuss its properties.

3. A) Find the inverse Laplace transform of the function $F(s)=s / ((s+a)(s+b))$ $a\neq b$. (Or)
   B) Derive first and second shifting theorems for Laplace transform.

4. A) Find the Fourier transform of function $f(t) =e^{-|t|}$ (Or)
   B) Expand as a Fourier series the function $f(x) = z^3 / (z-1) (z-2)(z-3)$ at its simple poles.

5. A) Define Beta function ß (m, n), show that it is symmetric about its indices m and n .   (Or)
   B) State and prove the orthogonal property of Laguerre polynomials.

Answer Any FOUR Questions   PART – B   (4 X 10 = 40)

6. State and prove stoke's theorem and deduce the following relation $\iint ds\times \blacktriangledown \phi=\int\phi dl$.

7. (i) Define the inner product of two tensors.
   (ii)State quotient law in tensor analysis and explain it with an example.

8. Prove the orthogonality relation $_{-1}\int^{1}P_n(x)P_m(x)dx = 0$ if $m \neq n$.

9. Derive relation between beta and gamma function.

10. Write short note on dirac delta function and its properties.

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VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University)

M.Sc. (PHYSICS) DEGREE EXAMINATION - November 2018
First Semester

DSC – III ADVANCED PHYSICS

Time: Three hours   Maximum: 70 marks

<div align="center">

PART – A   (5 x 6 = 30)
</div>

 (Answer ALL Questions)

1.a) Describe the hartree fock approximation. (or)

   b)Describe the basic function of electron gas and random phase approximation .

2.a)Explain the Anderson model for random system.(or)

   b)Describe the lattice vibration state for solid .

3.a)Write the short notes on . (or)

     1.electron orbits.

     2.hole orbits.

   b)Discuss about the Fermi surfaces and metals.

4.a)Write short notes on elastic energy of dislocations. (or)

   b)Obtain dislocations in fcc lattices..

5.a)Describe the study of surface topography. (or)

   b)Explain electrical conductivity of thin flims.

Answer any four questions only   PART- B   4 x 10 = 40

6.Derive the landaus quasi-particle equations from theory of Fermi liquid.

7.Describe atomic correlations function for glasses and liquids.

8. Discuss about the De Hass van Alphen effect.

<div align="right">(P.T.O)</div>

9.Explain the physical interpretation of effective masses in semiconductor.

10.Discuss about the Hartree and Hartree –fock approximation method.

11.Discuss about the dislocations in FCC and HCP lattice.

12.Explain the study of surface topographyof multiple beam of interferometry.

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Sl.No.1628

VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University)

M.Sc. (PHYSICS) DEGREE EXAMINATION – November - 2018
First Semester

DSEC – I SOLID STATE PHYSICS

Time: Three hours   Maximum: 70 marks

PART – A   (5 x 6 = 30)
(Answer ALL Questions)

1. a)Derive Bragg's condition in terms of reciprocal lattice vectors..   **(Or)**

   b) Explain briefly about the inelastic scattering of neutron by Phonons..

2. a) Describe and sketch the first Brillouin Zone of an oblique lattice in two dimension.   **(Or)**

   b)Discuss the variation of effective mass as a function of wave vector based on band theory..

3. a)What are the salient features of Einstein's theory of lattice heat capacity?. **(Or)**

   b)What is Hall effect? Explain the measurement of Hall coefficient and Hall angle.

4. a) Describe the quantum theory of paramagnetism**.(Or)**

   b)What is Magnons? Obtain the dispersion relation for spin waves in one dimension..

5. a) Briefly explain BCS theory in detail**..   (Or)**

   b) Discuss in detail the 'Meissner effect'..

Answer Any FOUR Questions   PART – B   (4 X 10 = 40)

6. Show that fcc structure has highest packing when compared to sc and bcc structures.

7. Explain the Debye model of lattice heat capacity. Obtain the Debye T^3 law..

8. Discuss the free electron gas in three dimension. Derive the expressions for the Fermi energy. .

9.Derive the Clausius Mossotti relation..

10.Derive London equations, and account for high frequency effects on superconductors..

11.Discuss Langevin classical theory of diamagnetism.

12. Explain in detail the domain theory of ferromagnetism and also explain the hysteresis curve on the basis of domains.

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VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University), SALEM

M.Sc. (physics) DEGREE EXAMINATION - November 2018
First Semester

Elements of Nanoscience and Nano Technology

Time: Three hours   Maximum: 70 marks

PART – A   (5 x 6 = 30)

(Answer ALL Questions)

1**.** a) Give one example each of one and two dimensional nano materials.   (Or)

   b) Discuss the nanowires and nanoclusters.

2**.** a) Explain the Semiconductor Quantum Dots   (Or)

   b) Explain Carbon nano structures with suitable diagram.

3. a) Discuss about the Chemical precipitation and coprecipitation. (Or)

   b)what are the difference between electro and photochemical synthesis ?

4. a) Explain the theory instrumentation of AFM technology.   (Or)

    b) Discuss about the photoluminescence.

5. a) Explain the electronic noises and biosensors.   (Or)

   b) Explain the Nano Drug Delivery System.

Answer Any FOUR Questions   **PART – B**   **(4 X 10 = 40)**

6. Discuss the optical properties.

7. Write short notes on vacuum technology.

8. Discuss about the Fundamentals of magnetic materials.

9.Briefly explain the types of Nano Composites.

10.Describe the nanofabrication by the method of Electron beam lithography.

11.Discuss about the principle, theory instrumentation of STM technology.

12. Write a notes on Waveguides and Photonic Crystal Fibres.

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VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University)

M.Sc. (physics) DEGREE EXAMINATION - November 2018
Third Semester

DSEC – III NANO PHYSICS

Time: Three hours   Maximum: 70 marks

PART – A   (5 x 6 = 30)

(Answer ALL Questions)

1. (a) Discuss about the Free electron theory and its features. (or)

   (b) Explain the insulators and semiconductors.

2. (a) Enunciate the background on Quantum dots.(or)

   (b) What are super lattice? Explain with suitable example..

3. (a) Discuss the variation of magnetic moment in nanosize magnetic materials . (or)

   (b) Write short note on Shift in photoluminescence peaks.

4. (a) Discuss any one method of nanomaterials by Bottom-up Process. (or)

   (b) Explain the Ball Milling method.

5. (a) What are the properties of nano structured materials?. (or)

   (b) How nano technology is used in drug delivery systems?.

Answer any four questions only.   **Part B**   **(4x 10 = 40 Marks)**

6. Describe in detail about the Variation of density of states in crystal structure.

7. Explain the Density of states in bands and Variation of density of states with energy.
8. Discuss about the Electron confinement in infinitely deep square well.

9. Discuss in detail the different types of nano tubes.

10. Explain the principle and determination of particle size and Increase in width of XRD peaks of nano particles .

11. Describe the chemical vapour deposition method (CVD).

12. Discuss about the nanostructure adsorbents in detail.

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VINAYAKA MISSION'S RESEARCH FOUNDATION, SALEM
(Deemed to be University)

M.Sc. (PHYSICS) DEGREE EXAMINATION - November 2018
Third Semester

GE – III PHYSICS OF NON-CONVENTIONAL ENERGY

Time: Three hours   Maximum: 70 marks

PART – A   (5 x 6 = 30)

(Answer ALL Questions)

1. (a) Write short note Energy source. (or)

    (b) Explain types of Energy source.

2. (a) Write neat diagram explain the electrical characteristics of a solar cell. (or)

    (b) Explain the classification of concentrating collectors..

3. (a) Write down the constructional details of a flat plate water heater. (or)

    (b) Write short note on solar distillation.

4. (a) With an example explain the term wind data conversion. (or)

    (b) Explain application of wind energy.

5. (a) Explain the term wet and dry process. (or)

    (b) List out the advantages of anaerobic digestion.

Part B   (4 x 10 = 40 Marks)

Answer any FOUR questions

6. Describe the various energy sources available on earth and their efficient usage patterns.

7. Explain the Solar constant and Solar radiation.

(P.T.O)

8   Discuss about the space heating and space cooling.

9. Discuss in detail about the construction and working of solar ponds..

10. Give an account on the basic components of wind energy conversion systems.

11.Discuss about different axis of wind mills.

12. Classify the different types of Biogas plants and explain the drum type biogas plants.

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Sl.No.1577

VINAYAKA MISSIONS RESEARCH FOUNDATION
(Deemed to be University) Salem
M.Sc(Physics/Chemistry) M.A(English) DEGREE EXAMINATION
November - 2018
Third Semester

HUMAN RIGHTS
(Candidates admitted under 2016 Regulations- CBCS)

Time: Three hours   Maximum:70 marks

Answer **ALL** questions

Part – A- (5 x 6 = 30)

1(a) what is meant by Human Rights?   **(OR)**
1(b) List out the acts passed to safeguard the Rights of Women in India After independence.

2(a) Examine the significance of the Right to Equality.   **(OR)**
2(b) what do you Know about the cultural And Educational Rights?

3(a) Write a note on the Right to work.   **(OR)**
3(b) what do you mean by the Right to social Security?

4 (a) Discuss about the right to clean Environment. **(OR)**
4(b) How to rights of the disabled are Protected? Explain.

5(a) Point out the achievements of the national human Rights Commission of India. **(OR)**
5 (b) Give an account of the state human Rights commissions.

PART-B   (4 x 10 =40)
ANSWER ANY FOUR QUESTIONS
6. Write an essay about the historical evolution of human rights.
7. Explain the civil & Political rights.
8. Write an essay on the right to vote & contest in election.
9. How are the rights of the children protected? Explain.
10. What do you know about the right to constitutional remedies? Explain its main features.
11. Give an account of the human rights courts and their functions.
12. How far the women's rights are violated in India? Suggest few remedial measures.

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