

70

Reg. No. : .....

**D 2132**

**Q.P. Code : [D 07 PPH 05]**

(For the candidates admitted during 2007 onwards)

**M.Sc. DEGREE EXAMINATION, MAY 2014.**

**Second Year**

**Physics**

**ADVANCED ELECTRONICS**

**Time : Three hours**

**Maximum : 100 marks**

**Answer any FIVE questions.**

**(5 × 20 = 100)**

1. (a) Explain common drain amplifier at high frequencies with a neat diagram.  
(b) Explain about differential amplifier and integrator.
2. (a) Write a note on Flip-flops and counters.  
(b) Describe about charge coupled devices.
3. (a) Outline the features of IC 555 timer and its applications.  
(b) Describe about phase shift oscillators and Wein bridge oscillators with neat diagram.

4. (a) Explain in detail about the effect of ground on antenna. What is meant by grounded  $\lambda/4$  antenna and undergrounded  $\lambda/2$  antenna.  
(b) Explain about microwave generation.  
(c) Write a note on multi cavity Klystron and reflex Klystron.
  5. (a) Describe about the elements of a radar system.  
(b) Obtain the expression for amplitude, frequency and pulse modulation.
  6. (a) Differentiate analog and digital signals.  
(b) Explain about black & white TV and colour TV transmission and reception.
  7. (a) Describe about analog computer set up to solve linear simultaneous equations using operational amplifier.  
(b) Write a note on NOR and NAND gates.
  8. (a) Explain frequency response of an operational amplifier.  
(b) Write a note on Multiplexers and De - multiplexers.
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71

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**D 2133**

**Q.P. Code : [D 07 PPH 06]**

(For the candidates admitted from 2007 onwards)

M.Sc. DEGREE EXAMINATION, MAY 2014

Second Year

Physics

**CONDENSED MATTER PHYSICS**

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

All questions carry equal marks.

(5 × 20 = 100)

1. (a) What do you mean by reciprocal lattice? Derive Bragg's law in reciprocal lattice.
- (b) Explain point defect in detail with suitable diagrams.
2. (a) Describe the different experimental techniques to study magnetic properties of materials.
- (b) Outline the BCS theory and derive an expression for the energy gap in a superconductor.

3. (a) Explain cap shaped nucleus and disc shaped nucleus with diagram.  
(b) Discuss BCF theory of solution growth.
4. (a) Write a note on Czochralski technique for crystal growth.  
(b) Describe about low temperature solution growth.
5. (a) Write about stationary temperature profile and oscillatory temperature profile.  
(b) Explain the experimental procedure for the growth of crystal from gel.
6. (a) Describe Bridgmann method of crystal growth from melt.  
(b) Discuss about the non-linear phenomena in KDP family crystals.
7. (a) Explain the production of colour centres by X-rays and irradiation.  
(b) Write a short note on high temperature super conductivity.
8. (a) Describe the working of rotary crystal method of X-ray diffraction.  
(b) Explain Weiss molecular field theory.

72

Reg. No. : .....

D 2134

Q.P. Code : [D 07 PPH 07]

(For the candidates admitted during 2007 onwards)

M.Sc. DEGREE EXAMINATION, MAY 2014.

Second Year

Physics

ELECTRODYNAMICS AND PLASMA PHYSICS

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

(5 × 20 = 100)

1. (a) Give the general polar diagram for Bremsstrahlung radiation. Discuss polarization of Bremsstrahlung radiation and its variation with particle energy and target characteristics.
- (b) Derive expressions for retarded potential and show that if the charges are stationary and currents are steady, these expressions become the solution of Poisson's equation.

7. (a) Explain about electron Plasma wave, Ion waves and Hydromagnetic waves.
- (b) Discuss the kinetic theory for plasma. Give the meaning of the distribution function  $f(v)$ .
8. (a) Outline the concept of  $\beta$  and explain about diffusion of magnetic field into plasma.
- (b) Explain about electromagnetic field tensor in four-dimensions and Maxwell's equations.
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73

Reg. No. : .....

D 2263

Q.P. Code : [D 07 PPH 08]

(For the candidates admitted from 2007 onwards)

M.Sc. DEGREE EXAMINATION, MAY 2014.

Second Year

Physics

COMPUTATIONAL METHODS AND PROGRAMMING

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

All questions carry equal marks.

(5 × 20 = 100)

1. (a) Find the real root of the equation  $x^3 - 3x + 1 = 0$  lying between 1 and 2 correct to three decimal places by using bisection method. (10)
- (b) Derive Newton Raphson iterative formula to find the roots of an equation. (10)
2. (a) Explain the finite difference method of solving partial differential equations with an example. (10)
- (b) Explain in detail the Monte-Carlo simulation technique. (10)

7. (a) Solve the following system of equations using Gauss elimination method.
- (i)  $x + y + z = 9$ ;  $2x - 3y + 4z = 13$ ;  
 $3x + 4y + 5z = 40$ . (5)
- (ii)  $x - y + z = 1$ ;  $-3x + 2y - 3z = -6$ ;  
 $2x - 5y + 4z = 5$ . (5)
- (b) Explain the use of 'if ... else' and switch statements in MATLAB. (10)
8. (a) Discuss about the essential features of MATLAB. (10)
- (b) Explain how titles, labels and text are included in MATLAB graphs. (10)
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