Code No. 5012 / O

FACULTY OF ENGINEERING AND INFORMATICS

B.E. I - Year (Suppl.) Examination, January 2016

Subject : Engineering Physics

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 The diameter of 10^{th} dark ring in a Newton's ring experiment is 0.50 cm in the reflected system. Calculate the thickness of the air film at the position and also the radius of curvature of the lens, given $^{a} = 5.9 \text{ x } 10^{-5}$ cm. 3

2 Define the phenomenon of "optical activity". 2

3 Define the concept of phase – space. 2

4 What are conduction and displacement currents? 3

5 State and explain "Miller Indices". 3

6 What is Hall effect? 2

7 The superconducting transition temperature of a metal is 7.26K. The critical field at 0 K is 64 x 10^3 A/m. Calculate the critical field at 5K. 2

8 What are soft and hard magnetic materials. 3

9 Explain the principle of X-ray florescence. 3

10 What are carbon nano-tubes? 2

PART – B (5 x 10 = 50 Marks)

11 a) Derive the expression for wavelength of incident light by using Newton's rings experiment. 5

b) Explain the construction and working of Nicol's Prism. What is the limitation for use of Nicol's Prism. 5

12 a) Apply the Schrödinger's time-independent wave equation to a particle in an infinite square well potential and calculate its eigen values. 5

b) Derive the Bose-Einstein's Statistics. 5

13 a) Describe the experimental method of powder diffraction to determine lattice constant "d". 5

b) Explain the salient features of Kronig-Penny model and how it lead to energy band formation. 5

14 a) Explain the experimental method of Schering-Bridge method for determination of dielectric constant. 5

b) What are high T_c super conductors and explain their preparation? 5

15 a) What is thin film and explain the thermal evaporation method for preparation of thin film? 5

b) Explain the working of Scanning Electron Microscope. 5

16 a) Explain the working of He-Ne gas laser. 5

b) Explain the Weiss molecular field theory of Ferro magnetism and obtain Curie-Weiss law. 5

17 a) Write a note on LED. 5

b) Write a note on construction and working on Solar cell. 5

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Code No. 5004 / N

FACULTY OF ENGINEERING & INFORMATICS

BE I – Year (Suppl.) (New) Examination, January 2016

Subject: Engineering Physics

Time : 3 Hours **Max. Marks: 75**

Note: Answer all questions from Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1 20 Fringes are displaced when a thin glass plate is introduced in one of the paths of the interfering beams in a Fresnel's biprism experiment. Find the thickness if its refractive index is 1.5 and the wavelength of the light used is $6000A^0$. (3)

2 What are the Basic principles of Holography? (2)

3 Explain the physical significance of wave function " Ψ " (3)

4 Calculate the numerical aperture, acceptance angle and critical angle of the fibre from the following data : n_1= 1.50 and n_2 = 1.45 (2)

5 In a simple cube lattice d_{100}: d_{110} : d_{111} is (2)
(a) 6:3:2 (b) 2:3: 6 (c) √2: √3: √6: (d) √6 : √3: √2

6 What is Hall effect? (3)

7 Mention any three applications of Ferroelectric materials. (2)

8 What are Type –I and Type –II super conductors? (3)

9 Distinguish between bulk, thin films and nano materials. (2)

10 Define the Principle of X-ray fluorescence. (3)

PART- B (50 Marks)

11 (a) Derive the expression for wavelength of incident light by using Fresnel"s Biprism experiment. (5)
(b) Explain the construction and working of Laurents' half shade polari meter. (5)

12 (a) Apply the Bose-Einstein's distribution to photon gas and derive Planck's law for black body radiation. (6)
(b) Derive the Schrödinger's time-independent wave equation. (4)

13 (a) Explain the experimental determination of lattice constant by powder diffraction Method. (5)
(b) Explain how Kronig-Penmy model of solids lead to energy band formation. (5)

14 (a) Explain the phenomenon of ferro electricity and how dielectric constant of Barium Titanate changes as its temperature changes. (6)
(b) Discuss the General properties of super conductors. (4)

15 (a) What are thin films? Describe the chemical vapour deposition method of preparation for thin films. (6)
(b) Describe the working of Scanning Electron Microscope. (4)

16 (a) Describe the Newton's rings formation and obtain an expression for wavelength of given light. (5)
(b) Explain the production of optical fibre by Double crucible method and mention any two applications of optical fibres. (5)

17 (a) Derive the expression for electron concentration in an intrinsic Semi conductor. (6)
(b) Explain the Weiss molecular field theory of Ferro Magnetism. (4)

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Code No. 5396 / S

FACULTIES OF ENGINEERING & TECHNOLOGY

B.E. / B.Tech. (Bridge Course) II – Semester (Suppl.) Examination, January 2016

Subject : Mathematics

Time : 3 hours **Max. Marks : 75**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (25 Marks)

1 Define Mean, Median and Mode. 2

2 A coin is tossed five times. What is the probability of getting all heads three times? 2

3 State Cauchy's mean value theorem. 2

4 Explain e^x sinx up to the term containing x^3. 2

5 Evaluate $\int_0^a \int_0^b (x^2 + y^2)dx\,dy$ 2

6 Find the area under the curve y = x from x = 0 to x = a. 3

7 For what value of 'a' the vector $\bar{F}$ = (x+3y)i + (y – 2z) j + (x+az) k is solenoidal. 3

8 Find grad r^n. 3

9 Evaluate $\int_0^\infty e^{-x^2} dx$ 3

10 Find the value of $\Gamma(-1/2)$. 3

PART – B (50 Marks)

11 a) State and prove addition theorem of probability. 5

b) Compute the arithmetic mean for the following data : 5

Height in (cms)	219	216	213	210	207	204	201	198	195
No. of persons	2	4	6	10	11	7	5	4	1

12 a) Verify Rolle's theorem for the function $f(x) = \log\left[\frac{(x^2 + ab)}{(a+b)x}\right]$ in [a, b]. 5

b) Find the Radius of curvature of the curve x= kt, y = log (sect) at any point 't'. 5

13 a) Find the complete area of the Asteroid $x^{2/3} + y^{2/3} = a^{2/3}$. 5

b) Evaluate $\int_0^{a} \int_0^{a\sin\theta} r\,dr\,d\theta$. 5

14 a) Prove that $\int_0^{\pi/2} \sin^m\theta \cos^n\theta\, d\theta = \frac{\Gamma\left(\frac{m+1}{2}\right)\Gamma\left(\frac{n+1}{2}\right)}{2\Gamma\left(\frac{m+n+2}{2}\right)}$ 5

b) Show that $\int_0^1 x^{a-1}\left[\log\left(\frac{1}{x}\right)\right]^{n-1} dx = \frac{\Gamma n}{a^n}$ 5

15 a) Find the envelope of the curve $y = mx + \sqrt{(a^2m^2 + b^2)}$, 'm' being the parameter. 5

b) Prove that $\nabla^2(r^n) = n(n+1)\,r^{n-2}$

16 a) Find the directional derivative of the vector $\bar{F} = 2xi + 3y^2j + z^3k$ at the point (1,1,1) in the direction of the vector i + 2j + 3k. 5

b) Find the evolute of the parabola $y^2 = 4ax$. 5

17 Verify Green's theorem for $\oint\{(2x^2 - y^2)dx + (x^2 + y^2)dy\}$, where 'C' is the closed curve bounded by the semi-circle $x^2 + y^2 = 1$ lying above x-axis. 10

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