AR-003-045103 Seat No. _____

BVOC (CHE TECH) (Sem. I) (CBCS) Examination

March / April – 2016

BVCT-103 : Core Elementary Physics & Mathematics

Faculty Code : 003
Subject Code : 045103

Time : Hours] [Total Marks : **70**

Instructions : (i) All questions are compulsory.
(ii) Draw diagram and/or scheme wherever necessary.
(iii) Answer both the sections in SEPARATE answer sheets.

SECTION - A
(Elementary Physics)

1 [A] Multiple Choice Questions 5

1. An electric field can deflect
   (a) X-rays (b) Neutrons
   (c) α – particles (d) γ - rays
2. The refractive index of diamond is 2,0, velocity of light in diamond in cm per second is approximately
   (a) 6×10^{10} (b) 3.0×10^{10}
   (c) 2×10^{10} (d) 1.5×10^{10}
3. Majority carriers in semiconductor are
   (a) Holes in N-type & electrons in P-type
   (b) Holes in N-type & P-type both
   (c) Electrons in N-type & P-type both
   (d) Holes in P-type & electrons, in N-type

4. An electric charge in motion produces

(a) An electric field only

(b) A magnetic field only

(c) Both electric and magnetic field

(d) No such field at all

5. Elastic constant associated with change in length is

(a) Young's Modulus

(b) Bulk Modulus

(c) Modulus of Rigidity

(d) Poisson's Ratio

[B] Multiple Choice Questions : 10

1. Force acting between two point charges is F. Now each of the two point charges are halved and distance is made double. So force between them is.

(a) F/2 (b) F/16

(c) F/8 (d) 16F

2. A completely transparent material will be invisible in vacuum when its refractive index μ is

(a) Unity

(b) More than unity

(c) Less than unity

(d) Equal to 1.33

3. N-Type germanium is obtained on doping intrinsic germanium by

(a) Phosphorous (b) Aluminum

(c) Boron (d) Gold

4. On applying a stress of 20×10^8 Nm^{-2}, the length of a perfectly elastic wire is doubled, its Young's-modulus will be _____ NM^{-2}.

(a) 5×10^8 (b) 10×10^8

(c) 20×10^8 (d) 40×10^8

5. _____ can be classified as fluid and _____can be classified as amalgam.

(a) Liquid, gas

(b) Liquid, mixture of liquid and solid

(c) Both (a) & (b)

(d) Solid, mixture of gas and solid

2 Answer any 4 the following 6 questions : 20

(1) Explain Zener Diode as Voltage Regulator

(2) Explain Internal resistance and Terminal voltage

(3) Explain law of Reflection with mirror formula.

(4) Describe in detail (a) Pascal's law and (b) Bulk Modulus

(5) Derive Gauss' theorem of electrostatic.

(6) Define electric force and explain superposition principle for net electric force produced by continuous distribution of charge.

SECTION - B

(Mathematics)

1 [A] Multiple Choice Questions : 5

1. Differentiation of e^x is _____

   a. e* c. 0

   b. e* d. 1

2. 1 radian = _____ degree

   a. 100° c. 69°

   b. 90° d. None

3. lnx + lny =_____

   a. xy c. ln (xy)

   b. ln (x+y) d. 0

4. If $\vec{A} \cdot \vec{B} = 0$, then angle between $\vec{A}$ and $\vec{B}$ is

   a. 0° c. 180°

   b. 90° d. 270°

5. $\vec{A} \times \vec{A}$ = _____ (if $\vec{A}$ is any vector)

   a. 0 c. $\vec{A}$

   b. 1 d. None

[B] Multiple Choke Questions 10

1. 40° = _____radian and 0.4 radian = _____ degree

   a. 29.2831, 0.9611

   b. 0.6981, 22.9183

   c. 0.6981, 0.9879

   d. 226.31, 0.3418

2. sin90° _____ while sin 990° = _____

a. 1, -1 c. 0,1

b. –1, 1 d. –1, 0

3. Differentiation of function $y =$ an is _____ given that u is variable and a is constant.

a. $a\frac{dy}{dx}$

b. $\frac{dy}{dx}$

c. 0

d. 1

4. If $y = \cos x,$ then $\frac{dy}{dx} =$ _____

a. cos x

b. sin x

c. – sinx

d. –cos x

5. Differentiation of e^{2x} = _____

a. e^{2x}

b. $e^{2x}/2$

c. $2e^{2x}$

d. None of these

2 Attempt any 4 from the following : 20

1. Using Integral Calculus find the area of any two dimensional figure.

2. If displacement $x = \left(2t^2 i + 2\sin j + e^{-x}k\right)$ then find displacement velocity and acceleration at $t = 0$ and $t = 2/s$

3. If $\vec{A} = -2i + 4j - 5k$ and $\vec{B} = 2i - 3j - 4k$ then find

   (i) $\vec{A} \cdot \vec{B}$ and

   (ii) $\vec{A} \times \vec{B}$

4. Using Gauss Elimination method find values of x, y and z from following equations:

   $x + 2y + 3z = 26$

   $2x + 3y + z = 34$

   $3x + 2y + z = 39$

5. Explain Different types of Errors in Numerical Compilations.

6. Find dy/dx given that $y = \left(x^2 - 1\right)^{5/2}$.