Hall Ticket Number :										

Code : 1GC12

R-11/R-13

B.Tech. I Year Supplementary Examinations June 2016

Engineering Physics

(Common to All Branches)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1.	a)	Explain Polarization of light wave.	3M
	b)	Describe the Fraunhofer diffraction due to single slit.	8M
	c)	Find the thickness of half wave plate for a light beam of wavelength 600nm, if the difference in the refractive indices of E and O rays is 0.1624.	3M
2.	a)	State and explain Bragg's Law for X-ray diffraction.	3M
	b)	Describe crystal structure determination by powder method.	8M
	c)	X-rays of wavelength 0.1 nm was diffracted by an angle of 30^o for the second order diffraction. Find the inter planar distance of the cubic crystal	3M
3.	a)	Mention the postulates of classical free electron theory.	3M
	b)	Describe the behavior of a free particle in a one dimensional potential box.	8M
	c)	Calculate the wavelength associated with electron raised to a potential of 1200V	3M
4.	a)	Explain diffusion of charge carriers in a semiconductor.	3M
	b)	Explain the formation of p-n junction in a semiconductor with necessary theory	7M
	c)	Distinguish between direct and indirect band gap semiconductors.	4M
5.	a)	Explain electronic polarization in a dielectric.	4M
	b)	Discuss the origin of magnetic moments in magnetic materials.	6M
	c)	What are soft and hard magnetic materials.	4M
6.	a)	Describe the flux quantization in superconductor.	4M
	b)	Explain the construction and working of Ga-As laser with neat diagram.	6M
	c)	Mention the characteristics of laser.	4M
7.	a)	Describe the construction of hologram.	4M
	b)	Describe briefly the different types of optical fibers with neat diagram with refractive index profiles.	7M
	c)	An optical fiber has a core refractive index of 1.52 and cladding refractive index of 1.50. Find its numerical aperture.	3M
8.	a)	What are nanomaterials and mention their significance.	4M
	b)	Describe Sol – Gel method of synthesis of nanomaterials.	6M
	c)	Mention the properties of carbon nanotubes.	4M

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Hall Ticket Number :										

Code : 1GC13

R-11/R-13

B.Tech. I Year Supplementary Examinations June 2016

Engineering Chemistry

(Common to All Branches)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Write about methods for the treatment of potable water. 6M
   b) What is external treatment of water? Write about ion-exchange method for treatment of industrial water. 5M
   c) What is caustic embrittlement and how to prevent it? 3M

2. a) Explain the applications of conductometric titrations in detail. 5M
   b) Explain H_2-O_2 fuel cell with neat sketch and chemical reactions. 5M
   c) Ni-Cd battery is recyclable justify! 4M

3. a) Explain the factors which effect the corrosion. 5M
   b) Explain the following methods for preventing corrosion.
      i) Electroplating ii) Electro less plating 5M
   c) Write a note on electrochemical corrosion with example. 4M

4. a) What are polymers? Write the mechanism for addition polymerization of ethylene. 6M
   b) Write the differences between thermosetting and thermoplastic resins. 5M
   c) Write a note on elastomers. 3M

5. a) Write a note on the following.
      i) RDX ii) Nitroglycerin 8
   b) Explain the classification and properties of lubricants in detail. 6M

6. a) Define independent and dependent variables with suitable examples 6M
   b) Explain one component system for water in detail. 8

7. a) What is fuel? Write the classification of fuel. 3M
   b) 0.6 g of coal sample with 92% C, 5% Hydrogen, and 3% ash, caused a rise in the temperature of 2000 g water by 3.2^o C in a bomb calorimeter experiment. Calculate the gross and net calorific value of coal, given. 6M
   c) Explain the conversion of coal into coke with neat sketch. 5M

8. a) Define refractory? Write the classification of refractory with suitable examples. 6M
   b) Explain the composition of Portland cement. 4M
   c) Comment on Portland cement analysis. 4M

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Hall Ticket Number :										

Code : 1GC14

R-11/R-13

B.Tech. I Year Supplementary Examinations May/June 2016

Mathematics-I

(Common to All Branches)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)

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1. a) Solve $\frac{dy}{dx} + x\sin 2y = x^3 \cos^2 y.$ 7M

   b) A body is heated to 110°C and placed in air at 10° C. After 1 hour its temperature is 60°C. How much additional time is required for it to cool to 30°C? 7M

2. a) Solve $\left(D^2+2\right)y = x^2 + x^3 + e^{-2x} + \cos 3x$, *where* $D = \frac{d}{dx}$. 7M

   b) Solve Non-Homogeneous ODE by Method of variation of parameters

   $(D^2 - 2D + 2)y = e^x \tan x$, *where* $D = \frac{d}{dx}$. 7M

3. a) Verify Rolle's theorem for $f(x) = e^x(\sin x - \cos x)$ *in* $\left[\frac{®}{4}, \frac{5®}{4}\right]$. 7M

   b) Find the maximum and minimum values of
   $f(x,y) = x^3 + 3xy^2 - 15x^2 - 15y^2 + 72x$. 7M

4. a) Trace the curve $r^2 = a^2 \sin 2\overline{\ }$. 7M

   b) Find the perimeter of the loop of the curve $3ay^2 = x(x-a)^2$. 7M

5. a) Evaluate $\int_{-1}^{1}\int_{0}^{z}\int_{x-z}^{x+z} (x+y+z)\,dx\,dy\,dz.$ 7M

   b) Evaluate $\int_{0}^{\infty}\int_{0}^{\infty} e^{-(x^2+y^2)}\,dx\,dy$ by changing to polar coordinates. 7M

6. a) (i) Find the Laplace Transform of $\left\{\left(\sqrt{t} + \frac{1}{\sqrt{t}}\right)^3\right\}$.

   (ii) Find $L^{-1}\left\{\frac{2s^2 - 6s + 5}{s^3 - 6s^2 + 11s - 6}\right\}$. 8M

   b) Find the Laplace Transform of a piecewise periodic function $f(t)$ with period T. 6M

7. a) (i) Find the Laplace Transform of the second derivative of $f(t)$.

   (ii) Find $L\left\{\int_0^t u\, e^{-u} \sin 4u\, du\right\}$. 7M

   b) Solve the following differential equation by the transform method;

   $\left(D^2 + n^2\right)x = a\sin(nt + \sim)$, $x = Dx = 0$ *at* $t = 0$ *where* $D = \frac{d}{dt}$. 7M

8. a) Evaluate divergence of $\left(2x^2 z\, i - xy^2 z\, j + 3yz^2\, k\right)$ at the point $(1, 1, 1)$. 4M

   b) State Green's theorem and Verify Green's theorem in plane for
   $\int_C \left[\left(3x^2 - 8y^2\right)dx + \left(4y - 6xy\right)dy\right]$, Where C is boundary of the region defined by $y = \sqrt{x}$ *and* $y = x^2$. 10M

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Hall Ticket Number :										

Code : 1G111

R-11/R-13

B.Tech. I Year Supplementary Examinations May/June 2016

Programming in C and Data Structures

(Common to CSE & IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)

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1.	a)	Define the flow chart? Draw a flow chart for finding GCD of two numbers?	8M
	b)	Write an algorithm to perform the greatest of three numbers.	6M
2.	a)	Explain briefly the structure of 'c'? Write a program to find Fibonacci series.	7M
	b)	Write a program to check that the entered year is a leap year or not using any one of the control statement.	7M
3.	a)	Explain two-dimensional array within an example?	7M
	b)	Write a program to display the number of days of given month of a year.	7M
4.	a)	Explain the relation between an array and a pointer?	8M
	b)	Write a program to display array elements and their address using pointers?	6M
5.	a)	Write a program to read and display car number, starting time and reaching time. Use structure within structure.	6M
	b)	Explain the operation of sequential access File with an example?	8M
6.	a)	Explain stack operations (Push and Pop) with an example?	7M
	b)	Differentiate between Queue, Dequeue, Circular Queue.	7M
7.	a)	Explain breadth first search (BFS) algorithms with an example.	7M
	b)	Explain Tree Traversal techniques with an example.	7M
8.	a)	Write and explain non-recursive algorithm for binary search with suitable example and discuss the various time complexities of binary search.	7M
	b)	Explain the algorithm for selection sort and give a suitable example.	7M

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Hall Ticket Number :										

Code : 1G513

R-11/R-13

B.Tech. I Year Supplementary Examinations May/June 2016

Engineering Drawing

(Common to EEE, ECE, CSE and IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. The major axis of an ellipse is 100 mm long and the foci are at a distance of 15 mm from its ends. Draw the ellipse, one half of it by "concentric circles" method and the other half by "oblong method". 14M

2. Draw a hypocycloid generated by a rolling circle of 60 mm diameter for one complete revolution. The radius of the directing circle is 100 mm. Draw a tangent and a normal to the hypocycloid at 50 mm from the center of the directing circle. 14M

3. A line AB, 90 mm long is inclined at 45° to the H.P and its top view makes an angle of 60° with the V.P. The end A is in the H.P and 12 mm in front of the V.P. Draw its front view and find its true inclination with V.P. 14M

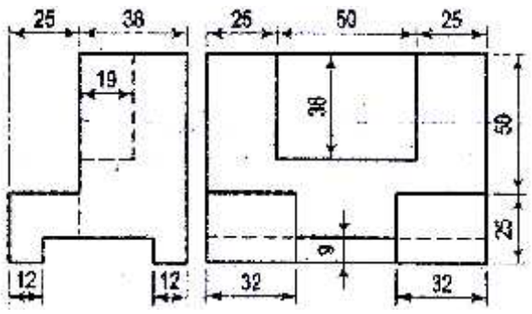
4. A regular hexagon of 40 mm side has a corner in the H.P. Its surface is inclined at 45° to the H.P and the top view of the diagonal through the corner which is in the H.P makes an angle of 60° with the V.P. Draw its projections. 14M

5. A square prism, base 40 mm side and height 65 mm, has its axis inclined at 45° to the H.P and has an edge of its base, on the H.P and inclined at 30° to the V.P. Draw its projections. 14M

6. a) What is meant by isometric axis and isometric scale? 5M

   b) A cylindrical block of base, 60 mm diameter and height 90 mm, standing on the H.P with its axis perpendicular to the H.P. Draw its isometric view. 9M

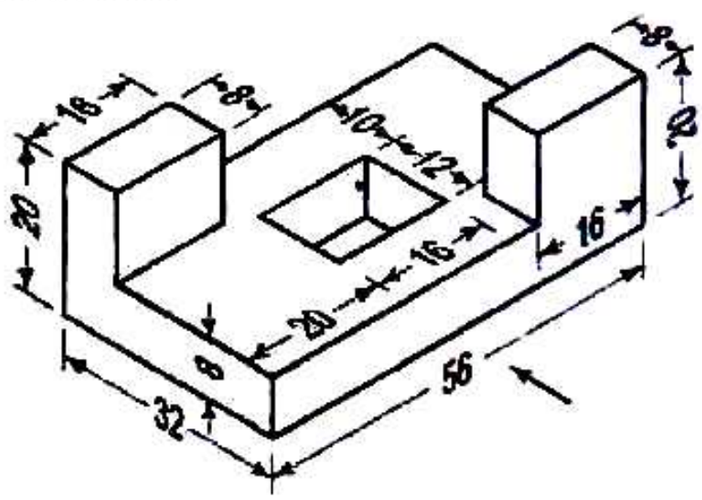
7. Draw the isometric view of the object, the orthographic views of which are shown in figure below. All dimensions are in mm.



Right side view Front View

14M

8. Draw the following views for the object shown in figure below. .
   a) Front view b) Top view c) Left side view
   All dimensions are in mm.



14M

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Hall Ticket Number :										

Code : 1GC15

R-11/R-13

B.Tech. I Year Supplementary Examinations May/June 2016

Mathematical Methods

(Common to CSE & IT)

Max. Marks: 70 **Time: 03 Hours**

Answer *any five* questions

All Questions carry equal marks (14 Marks each)

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1. a) Find the rank of $\begin{bmatrix} -1 & 2 & 1 & 8 \\ 2 & 1 & -1 & 0 \\ 3 & 2 & 1 & 7 \end{bmatrix}$ 7M

   b) Investigate the values of λ and *μ* so that the equations $2x+3y+5z=9,\quad 7x+3y-2z=8,\quad 2x+3y+{}^{a}z=«$, have (**i**) no solution (**ii**) a unique solution and (**iii**) an infinite number of solutions. 7M

2 a) Find the eigen values and the corresponding eigen vectors of

$$A = \begin{bmatrix} -2 & 2 & -3 \\ 2 & 1 & -6 \\ -1 & -2 & 0 \end{bmatrix}$$ 7M

   b) Verify Cayley-Hamilton theorem for the matrix A and find its inverse

$$A = \begin{bmatrix} 7 & 2 & -2 \\ -6 & -1 & 2 \\ 6 & 2 & -1 \end{bmatrix}$$ 7M

3. a) Reduce the quadratic form $10x^2+2y^2+5z^2-4xy+6yz-10xz$ to the canonical form. 10M

   b) Prove that every Hermitian matrix can be written as $A+iB$, where *A* is real and symmetric and *B* is real and skew-symmetric. 4M

4. a) Find a root of the equation $x^3-4x-9=0$ using the bisection method in four stages. 7M

   b) The population of a town in the decimal census was given below. Estimate the population for the year 1925. 7M

year	1891	1901	1911	1921	1931
Population (thousands)	46	66	81	93	101

5. a) Fit a straight line of the form $y=a+bx$ for the following data. 7M

x	0	5	10	15	20	25
y	12	15	17	22	24	30

   b) Using the method of least squares, find the constants a and b such that $y=ae^{bx}$ fits the following data.

x	0.0	0.5	1.0	1.5	2.0	2.5
y	0.10	0.45	2.15	9.15	40.35	180.75

7M

6. a) Find the first and second derivatives of the function tabulated below at the point $x = 1.5$. 7M

x	1.5	2.0	2.5	3.0	3.5	4.0
y	3.375	7.0	13.625	24.0	38.875	59.0

b) Calculate the value of $\int_0^{\frac{\pi}{2}} \sin x \, dx$ by Simpson's 1/3 rule, using 11 ordinates. 7M

7. a) Find by Taylor's series method the value of y at $x = 0.1$ and $x = 0.2$ to five places of decimals from $\frac{dy}{dx} = x^2 y - 1, \quad y(0) = 1.$ 7M

b) Use Runge-Kutta method of fourth order to find y when $x = 1.2$ in steps of 0.1, given that $\frac{dy}{dx} = x^2 + y^2$ and $y(1) = 1.5$. 7M

8. a) Obtain the Fourier series for e^{-x} in the interval $0 < x < 2\pi$. 7M

b) Express $f(x) = x$ as a half range cosine series in $0 < x < 2$. 7M

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