Hall Ticket Number :										

R-11/R-13

Code: 1G311

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

Electronic Devices and circuits

(Common to EEE & ECE)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions

All Questions carry equal Marks (**14 Marks** each)

****

1. a) Tabulate significant differences between insulators, conductors and semiconductors. With neat diagram explain Fermi level in intrinsic and extrinsic Semiconductors. 7M
   b) Explain the law of mass action. 7M
2. a) Derive the V-I characteristics of PN junction diode in forward and reverse bias conditions. 7M
   b) Explain how Zener diode is different from ordinary diode. Under what circumstances ordinary diode used in rectifier can be replaced with Zener diode? 7M
3. a) Explain construction and working of bridge rectifier with neat diagram and derive output DC voltage, ripple factor and peak inverse voltage of diodes. 7M
   b) Draw simple Zener voltage regulator circuit. Design a Zener voltage regulator that will maintain constant output voltage of 25 V across a 1-kΩ load with an input that will vary between 30V and 50 V. Determine the proper value of Rs and the maximum current I_{ZM}. 7M
4. a) With neat diagram explain working of NPN transistor and derive the expression for output current in CE configuration. 7M
   b) Compare the transistor characteristics in CB, CC and CE configurations. 7M
5. a) Explain different biasing methods used in transistor circuits? Compare merits of voltage divider bias and fixed bias methods. 7M
   b) Explain the term thermal runaway. How it affects the performance of the transistor? Mention measures to reduce this effect. 7M
6. a) Draw labeled diagram showing constructional features of N-channel MOSFET. Explain principle and working of N-channel MOSFET. Mention some applications of MOSFET 7M
   b) Explain different FET biasing configurations? Compare merits of voltage divider bias over self-bias. 7M
7. a) Write note on different transistor configurations and their hybrid models. 7M
   b) State and explain Miller's theorem and Dual of Miller's theorem. 7M
8. a) Draw labeled diagram showing constructional features of SCR. Explain working of SCR. Mention some applications of SCR. 8M
   b) Write short notes on
      i) Photo transistor
      ii) Tunnel diode
      iii) UJT 6M

***

Hall Ticket Number :										

R-11/R-13

Code: 1GC13

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

Engineering Chemistry

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions

All Questions carry equal Marks (**14 Marks** each)

****

1. a) Discuss, in brief, the boiler corrosion. How is it controlled? 6M
   b) Write short notes on
      (i) Phosphate Conditioning
      (ii) ion-exchange process 8M
2. a) Calculate the emf of the cell : Ni / Ni^{2+} (IM) // Pb^{2+} (IM) / Pb at 25°C. Write down its cell reactions. Standard electrode potential of nickel and lead are -0.24 V and -0.13 V respectively at 25°C. 7M
   b) What are insulators? Give the various engineering applications of insulators. 7M
3. a) Discuss the role of nature of oxide layer formed in oxidation corrosion. State and explain Pilling – Bed worth Rule. 8M
   b) Give reasons for the following :
      (i) Corrosion of water-filled tank occurs below the waterline
      (ii) A Copper equipment should not possess a small Steel bolt 6M
4. a) Differentiate between addition polymerization and condensation polymerization with suitable examples. 6M
   b) Describe the method of preparation, properties and applications of the following
      (i) Bakelite 8M
      (ii) Nitrile Rubber
5. a) What are explosives? Explain the manufacture and applications of dynamite. 6M
   b) What is meant by lubricant? Explain the properties of lubricants such as viscosity and aniline point. 8M
6. a) Draw a neat labelled phase diagram of water system and explain areas, curves and triple point in it. 8M
   b) Define the terms : Phase, Component and Degree of freedom used in phase rule. 6M
7. a) Describe, in brief, the manufacture of metallurgical coke by Otto Hoffman's oven method. 7M
   b) Calculate the minimum weight of air required for complete combustion of 1 kg of fuel containing : C = 90 %, H = 3.5 %, O = 3.0 %, S = 0.5 %, H_2O = 1.0 %, N = 0.5% and ash = rest. 7M
8. a) What is a refractory material? Write a detail note on acid and basic refractories and their uses. 7M
   b) Write the chemical reactions that take place during setting cement and explain. 7M

***

Hall Ticket Number :										

Code: 1GC12

R-11/R-13

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

Engineering Physics

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

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

****

1.	a)	Distinguish between interference and diffraction of light.	3M
	b)	Explain the formation of Newton's rings with necessary theory.	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 0.125.	3M
2.	a)	State and explain Bragg's Law for X-ray diffraction.	4M
	b)	Describe the basic crystal systems based on lattice parameters	7M
	c)	Find the maximum wavelength of X-rays which can be diffracted by a crystal with interplanar spacing of $2.5A^0$ in first order diffraction.	3M
3.	a)	Define Heisenberg's uncertainty principal.	2M
	b)	Derive Schrodinger's one dimensional time independent wave equation for a free particle.	8M
	c)	Explain various sources of electrical resistance in the case of metals.	4M
4.	a)	Distinguish between drift and diffusion of charge carriers in a semiconductor.	3M
	b)	Explain the formation of p-n junction in a semiconductor with necessary theory.	7M
	c)	Explain the construction and working principle of LED.	4M
5.	a)	What are soft and hard magnetic materials.	3M
	b)	Derive Clausius-Mosotti relation for a polarized dielectric.	7M
	c)	Explain the concept of hysteresis for ferromagnetic material.	4M
6.	a)	Mention the significance of penetration depth on superconductor.	3M
	b)	Describe the construction and working of He-Ne laser with neat diagrams	7M
	c)	Explain BCS theory of superconductivity.	4M
7.	a)	Describe graded index optical fiber along with its refractive index profile.	4M
	b)	Describe the various important components of optical fiber communication system.	7M
	c)	Mention the important applications of holography.	3M
8.	a)	Explain the basic principal factors influencing nanomaterial Properties.	4M
	b)	Describe Sol-Gel method of synthesis of nanomaterials.	6M
	c)	Mention the significant properties of Carbon nanotubes.	4M

***

Hall Ticket Number :										

Code: 1GC14

R-11/R-13

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

Mathematics-I

(Common to All Branches)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions

All Questions carry equal Marks (**14 Marks** each)

****

1. a) Solve the differential equation $x\frac{dy}{dx}+y=x^3y^6$ 4M

   b) Find the equation of the system of orthogonal trajectories to the family of curves $r^n\sin n\theta=a^n$, where a is parameter 4M

   c) The temperature of a body drops from 100℃ to 75℃ in ten minutes when the surrounding air is at 20℃. What will be the temperature after half an hour? When will, the temperature be 25℃ 6M

2. a) Solve the differential equation $(D^3+2D^2+D)y=e^{2x}+x^2+x+\sin 2x$ 7M

   b) Solve by the method of variation of parameters, $(D^2-2D)y=e^x\sin x$ 7M

3. a) If a < b , prove that $\frac{b-a}{1+b^2}<\tan^{-1}b-\tan^{-1}a<\frac{b-a}{1+a^2}$ using Lagrange's mean value theorem and hence deduce that $\frac{\pi}{4}+\frac{3}{25}<\tan^{-1}\frac{4}{3}<\frac{\pi}{4}+\frac{1}{6}$ 7M

   b) A rectangular box open at the top is to have a volume of 32 cubic feet. Find the dimensions of the box requiring least material for its construction. 7M

4. a) Trace the curve, $a^2y^2=x^2(a^2-x^2)$ 7M

   b) Find the volume formed by the revolution of the loop of the curve $y^2(a+x)=x^2(3a-x)$ about the x – axis. 7M

5. a) Evaluate $\iint_R xy\,dxdy$ where R is the region bounded by x – axis, ordinate x = 2a , and the curve $x^2=4ay$ 7M

   b) By changing the order of integration, evaluate $\int_0^3\int_1^{\sqrt{4-y}}(x+y)\,dx\,dy$ 7M

6. a) Obtain the Laplace transform of the function $f(t)=\begin{cases}(t-1)^2, & t>1\\ 0, & 0<t<1\end{cases}$ 7M

   b) Using convolution theorem, evaluate $L^{-1}\left\{\frac{1}{s(s^2+2s+2)}\right\}$ 7M

7. Solve the differential equation $\frac{d^2x}{dt^2}-4\frac{dx}{dt}-12x=e^{3t}$ given that $x(0)=1$ *and* $x'(0)=-2$ using Laplace transforms 14M

8. a) Using line integral, calculate the work done by the force, $\bar{F}=(3x^2-6yz)\,\bar{i}+(2y+3xz)\,\bar{j}+(1-4xyz^2)\,\bar{k}$ in moving a particle from the point (0,0,0) to the point (1,1,1) along the curve $C: x=t,\ y=t^2,\ z=t^3$ 7M

   b) Verify greens theorem in the plane for $\oint_C(3x^2-8y^2)\,dx+(4y-6xy)\,dy$ where C is the region bounded by $y=\sqrt{x}$ *and* $y=x^2$ 7M

****

Hall Ticket Number :										

R-11/R-13

Code : 1G112

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

C Programming and Introduction to Data Structures

(Common to CE, EEE, ME & ECE)

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

Answer *any* **five** questions

All Questions carry equal marks (14 Marks each)

****

1.	a)	Explain SDLC process and need of it.	8M
	b)	Write an algorithm for finding the greatest number among three numbers	6M
2.	a)	List the different data types along with memory occupations in C with suitable example.	8M
	b)	Explain for loop and nested for loop with suitable example.	6M
3.	a)	Write a program to read array of numbers and compute sum and average of the numbers.	6M
	b)	Define an Array? What are different types of Arrays explain?	8M
4.		Write about String manipulations functions available in C with examples.	14M
5.	a)	Distinguish between array of Structures and an array within structures with an example.	8M
	b)	Define Structure and write general format for declaring and accessing structure members.	6M
6.	a)	Explain about defining, opening and closing of a file.	9M
	b)	Write a C program to print “Message” using command line arguments.	5M
7.		Define Queue and explain Queue implementation using arrays	14M
8.	a)	Write a C program to search an element using binary search	7M
	b)	Explain in detail about insertion sort.	7M

***

Hall Ticket Number :										

R-11/R-13

Code: 1G513

B.Tech. I Year Supplementary Examinations Nov/Dec 2016

Engineering Drawing

(Common to EEE, ECE, CSE & IT)

Max. Marks: 70 Time: 3 Hours

Answer *any* **five** questions

All Questions carry equal Marks (**14 Marks** each)

****

1. a) The major and minor axis of an ellipse is 120&80 mm. Draw an ellipse by arcs of circles method. 7M

   b) The asymptotes of a hyperbola are inclined at 700 to each other. Construct the curve when a point p on it is at a distance of 20 mm and 30 mm from the two asymptotes 7M

2. A circle of 60 mm diameter rolls without slipping on the outside of another circle of diameter 150 mm. Show the path of a point on the periphery of the (generating)rolling circle, diametrically opposite to the initial point of contact between the circle 14M

3. a) A line CD measures 80mm is inclined at an angle of 300 to HP and 450 to VP. The point C is 20mm above HP and 30mm in front of VP. Draw the projections of the line. 7M

   b) Draw the projections of a line JK 70 mm long and touching both HP and VP. It is inclined at 400 to HP and 350 to VP. 7M

4. a) A hexagonal plane of side 30 mm is perpendicular to V.P and Parallel to H.P One of its side is perpendicular to V.P. Draw its projections 7M

   b) A circular lamina of 30 mm radius is perpendicular to V.P and its diameter AB is inclined at 450 to H.P Draw its projections 7M

5. a) Draw the projections of cylinder of base 40 mm diameter, axis 50mm long, resting on ground on its base. 7M

   b) Draw the projections of a hexagonal pyramid axis 60 mm long, base 30 mm side having base on the ground and one of edges of base inclined at 450 to V.P. 7M

6. Draw the isometric projection of a rectangular prism of base 50 mm X40 mm and height 75 mm , when it rest with its base on H.P. and one of its rectangular faces is parallel to V.P. 14M

7. Draw the elevation, plan and left and right side views of the part shown in the figure.1.(dimensions are in mm).

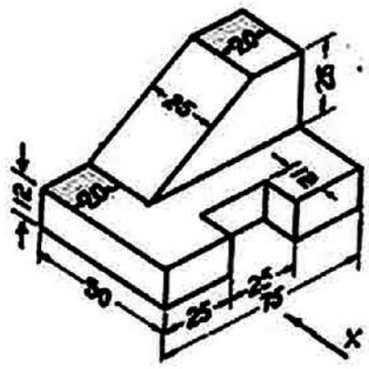

Figure. 1 14M

8. The orthographic views of an object using the first angle projection method are shown in the FIGURE-2 . Draw the isometric projection.

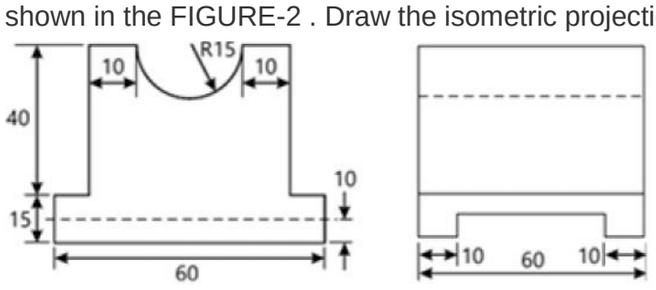

Figure 2 14M

***