

Code : 1G311

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

Electronic Devices and circuits*(Common to EEE and ECE)***Max. Marks: 70****Time: 03 Hours**

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) Draw the energy band diagrams of an insulator, semiconductor and conductor, and explain the same. 9M
b) Explain the mass-action law 5M
2. a) Draw and explain the V-I characteristics of Ideal diode. 6M
b) The reverse saturation current of a silicon PN-junction diode is $10 \mu\text{A}$ at the temperature 300 K. Determine the forward bias voltage to be applied across the PN-junction to obtain a current of about 100 mA. 4M
c) List the applications of PN-Junction Diode. 4M
3. a) A centre-tapped full-wave rectifier has $R_L = 1 \text{ K}$. Each diode has a forward bias dynamic resistance $r_d = 10$. The voltage across half the secondary winding is $220 \sin 314t$. Find (i) Peak value of current, (ii) DC value of current, (iii) Ripple factor. 6M
b) Briefly explain the operation of Zener voltage regulator. 6M
c) Define ripple factor. 2M
4. a) Explain why a transistor is able to amplify AC input signals. 5M
b) How do you select operating point in characteristic graph? 5M
c) Derive the relation between β_{ac} and β_{dc} . 4M
5. a) What are the factors that can affect the stability of a transistor? 4M
b) Explain the phenomena of thermal runaway 5M
c) A collector to base bias circuit has $V_{CC} = 12\text{V}$; $R_C = 1.5 \text{ K}$; $R_B = 60 \text{ K}$; $V_{BE} = 0.7 \text{ V}$ and $h_{fe} = 150$. Determine the values of operating point. 5M
6. a) Draw the drain characteristics and transfer characteristics of N-channel JFET and explain briefly. 10M
b) Compare P and N channel MOSFET's. 4M
7. a) Draw the small signal hybrid model of CB amplifier and derive the expressions for its A_i , A_v , R_i and R_o 10M
b) State Dual of Miller's theorem. 4M
8. a) Describe the construction and V-I characteristics of Tunnel diode. 8M
b) Write a brief note on Opto-Isolators. 6M

Code : 1GC14

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)

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 $(D^2 + 2)y = x^2 + x^3 + e^{-2x} + \cos 3x$, 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 $\left[\frac{f}{4}, \frac{5f}{4}\right]$. 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 $r^2 = a^2 \sin 2\theta$. 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;
 $(D^2 + n^2)x = a \sin (nt + \Gamma)$, $x = Dx = 0$ at $t = 0$ where $D = \frac{d}{dt}$. 7M
8. a) Evaluate divergence of $(2x^2z \mathbf{i} - xy^2z \mathbf{j} + 3yz^2 \mathbf{k})$ at the point $(1, 1, 1)$. 4M
- b) State Green's theorem and Verify Green's theorem in plane for
 $\int_C [(3x^2 - 8y^2)dx + (4y - 6xy)dy]$, Where C is boundary of the region defined
 by $y = \sqrt{x}$ and $y = x^2$. 10M

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R-11/R-13

Code : 1G112

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

C Programming and introduction to Data Structures

(Common to Civil, EEE, ME and ECE)

Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

1. a) What are computing environments? 7M
b) Explain the history of programming languages. 7M
2. a) Write a C program for checking the given number is prime or not 7M
b) Explain with example, switch statement in C. 7M
3. a) How single dimensional arrays and multidimensional arrays are declared and initialized? Explain with suitable examples. 7M
b) How pointers permit inter function communication. 7M
4. a) How to declare and initialization of strings? Explain them with examples. 8M
b) How C permits allocation and reallocation of memory. 6M
5. a) Write a C program using structure to create a library catalogue with the following fields; Access number, author's name. Title of the book, year of publication, publisher's name, price 6M
b) Differentiate between a structure and union with respective allocation of memory by the compiler. Given an example of each. 8M
6. a) Write a program to copy upto 100 characters from a file to an output array. 7M
b) Distinguish between text mode and binary mode operation of a file. 7M
7. a) What is linked list? List different types of linked list. Write a C program to demonstrate simple linked list. 9M
b) Describe the operations on a stack with examples. 5M
8. a) Write a C program to search for a given element in the integer array using binary search 8M
b) Compare the advantage and disadvantage of bubble, insertion and selection sort 6M

Code : 1G513

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

Engineering Drawing

(Common to EEE, ECE, CSE and IT)

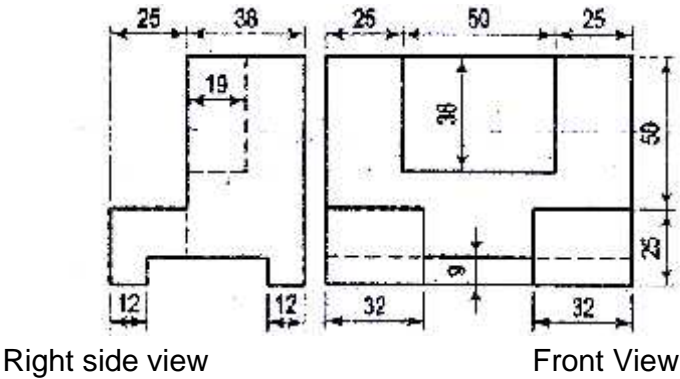
Max. Marks: 70

Time: 03 Hours

Answer any five questions

All Questions carry equal marks (14 Marks each)

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. 14M



8. Draw the following views for the object shown in figure below. . 14M
 a) Front view b) Top view c) Left side view
 All dimensions are in mm.

