Total No. of Questions :5]   [Total No. of Printed Pages :2

Roll No ....

CS/IT - 304

B.E. III Semester

Examination, June 2014

Electronics Devices and Circuit

Time : Three Hours

Maximum Marks : 70

Note: i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

1. a) Why does the conductivity of a semiconductor change with the rise in temperature?   2
   b) For faster action which transistor is used and why.   2
   c) What is a varactor diode?   3
   d) Explain the principle of operation of any one type of MOSFET.   7

OR

Explain the four modes of operation of BJT.   7

2. a) What do you mean by feedback?   2
   b) An amplifier has a gain of 2×10^5 without feedback determine the gain if negative feedback is applied given $\beta = 0.02$ 2
   c) Explain the effect of negative feedback on bandwidth.   3
   d) Explain the wein bridge oscillator in detail.   7

OR

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[2]

With the neat diagram explain the class B push pull amplifier.   7

3. a) Write the applications of clamping circuits.   2
   b) Why differential amplifier is necessary?   2
   c) Define differential gain and common mode gain.   3
   d) Draw and explain Darlington amplifier.   7

OR

Draw the circuit diagram of a stable multivibrator.   7

4. a) Define slew rate.   2
   b) List down characteristics of OPAMP.   2
   c) Determine the voltage gain for the circuit shown.   3

Given RF = 100 kΩ
R1 = 10 kΩ
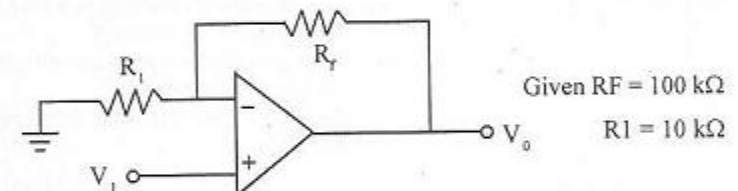
   d) Draw and explain OPAMP as an integrator.   7

OR

Give the pin connections of IC 555 explain the use of each pin.   7

5. a) What is line regulation and load regulation?   2
   b) Define voltage regulation.   2
   c) Briefly explain the working of zener regulator.   3
   d) Draw the block diagram and explain switched mode power supply.   7

OR

Explain a current limiting circuit.   7

CS/IT-304

OR

Evaluate the integral $\int_0^\infty \frac{\cos ax}{x^2+1}dx$.   7

2. a) Determine the Newton - Raphson iterative formula to find the kth root of N.   2

   b) Find a real root of the equation $x\log_{10} x=1.2$ by regula - falsi method correct to one decimal place.   2

   c) Find a real root of the equation $3x=\cos x+1$ by iterative method correct to two decimal places.   3

   d) Apply Crout's factorization method to solve the system of equations: 7

   $x-y=0$
   $-2x+4y-2z=-1$
   $-y+2z=1.5$

OR

   Apply Gauss-Seidel iteration method to solve the system of equations: 7

   $20x+y-2z=17$
   $3x+20y-z=-18$
   $2x-3y+20z=1.5$

3. a) Prove that: $e^x=\left(\frac{\Delta^2}{E}\right)e^x.\frac{Ee^x}{\Delta^2 e^x}$ 2

   b) Derive Newton's forward interpolation formula.   2

   c) Evaluate the integral $\int_0^{0.6} e^{-x^2} dx$ by Simpson $\frac{1}{3}$ rule.   3

   d) Apply Newton's divided difference formula to find the value of $f(9)$ from the following table: 7

x	5	7	11	13	17
$f(x)$	150	392	1452	2368	5202

OR

   Find $\frac{dy}{dx}$ at $x=1.1$ from the following table: 7

x	1.0	1.2	1.4	1.6	1.8	2.0
y	0	0.128	0.544	1.296	2.432	4.000

4. a) Find by Taylor's series method the value y(0.1) correct to three decimal places from the differential equation:

   $\frac{dy}{dx}=x^2y-y, y(0)=1$.   2

   b) Write the working rule of Runge-Kutta method of fourth order for the numerical solution of differential equation.   2

   c) If θ is the angle between the two regression lines show that: 3

   $\tan\theta=\frac{1-r^2}{r}.\frac{\sigma_x\sigma_y}{\sigma_x^2+\sigma_y^2}$.

   d) Using modified Euler's method, find the value of y (0.3) from the equation: 7

   $\frac{dy}{dx}=x+y, y(0)=1$.

OR