S.E. I.T Sem 3 (old) 20/11/14
Maths.

(OLD COURSE) **QP Code :12219**

(3 Hours) [Total Marks : 100

N.B : (1) Question No.**1** is **compulsory**.
(2) Attempt any **four** questions from the remaining questions.
(3) **Figures** to the **right** indicate **full** marks.
(4) Use of scientific calculator is allowed.

1. (a) State and prove first Shifting property. Hence Find Laplace transform of cosh2t.sin3t. 5
(b) Find Fourier series of $f(x) = 2x$ in $(-1, 1)$. 5
(c) Prove that every square matrix can be uniquely expressed as sum of Hermitian matrix and Skew- Hermitian matrix. 5
(d) Find the constants a, if $f(z) = \frac{1}{2}.\log(x^2 + y^2) + \tan^{-1}\left(\frac{ay}{x}\right)$ is an analytic function. 5

2. (a) Show that the function $u = e^x \cos y$ is an harmonic. hence find it's corresponding analytic function. 6
(b) Find the Laplace transform of the following functions 6

(i) $\frac{1-\cos 2t}{t}$ (ii) $t\sin 3t.\cos 2t$

(c) Find Fourier series for $f(x) = \frac{1}{2}(\pi - x)$ in $(0, 2\pi)$. hence deduce that 8

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots$$

3. (a) Find half range cosine series for $f(x) = x$ in $(0, 2)$ hence by using Parseval's identity 6

deduce that $\frac{\pi^4}{96} = \frac{1}{1^4} + \frac{1}{3^4} + \frac{1}{5^4} + \ldots$

(b) Find the orthogonal trajectory of the family of the curves $x^3y - xy^3 = c$. 6
(c) Find inverse Laplace transform of the following functions 8

(i) $\frac{(s^2 + 2s + 2)}{(s^2 + 2s + 5)(s^2 + 2s + 11)}$

(ii) $\frac{1}{s}.\log\left(\frac{s+4}{s+7}\right)$

4. (a) Find the bilinear transformation which maps the points 2, i, -2 onto the points 1, i, -1. 6
(b) Use the adjoint method to find the inverse of 6

$$\begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$$

(c) By using Laplace transform , Solve $y''+3y'+2y = \sin 3t$; $y(0) = 0$,$y'(0) = 0$. 8

5. (a) Obtain Fourier Series for : 6

$$f(x) = \begin{cases} x + \frac{\pi}{2} & -\pi < x < 0 \\ \frac{\pi}{2} - x & 0 < x < \pi \end{cases}$$

(b) Find the image of the circle $|Z-3| = 3$ in the z- plane into the w- plane under the transformation $w = 1/z$ 6

(c) Find non singular matrices P and Q such that 8

$$\text{Where } A = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$$

is reduced to normal form. Also find it's rank.

6. (a) Reduce the matrix to the normal form and Find the rank of the following matrix 6

$$\begin{bmatrix} 1 & 4 & 1 & 3 \\ 2 & 1 & -1 & 4 \\ 6 & 2 & 1 & 1 \end{bmatrix}$$

(b) By using Cauchy's residue theorem, Evaluate $\int_0^{2\pi} \frac{d\theta}{(5+4\cos\theta)}$ 6

(c) Show that the set of functions cosx, cos2x, cos3x, --- is orthogonal on $(0,2\pi)$ Hence construct orthonormal set of functions.

7. (a) For what value of λ and μ the system of equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ will have no solution , Unique Solution, and infinite number of solutions. 6

(b) Obtain Half range sine series to represent 6

$$f(x) = \begin{cases} \frac{2x}{3} & 0 \le x \le \frac{\pi}{3} \\ \frac{\pi - x}{3} & \frac{\pi}{3} \le x \le \pi \end{cases}$$

(c) Expand all possible Taylor's and Laurent's series expansions for the function 8

$f(z) = \frac{z}{(z-2)(z-1)}$ about $z = 0$ indicating the region of convergence.

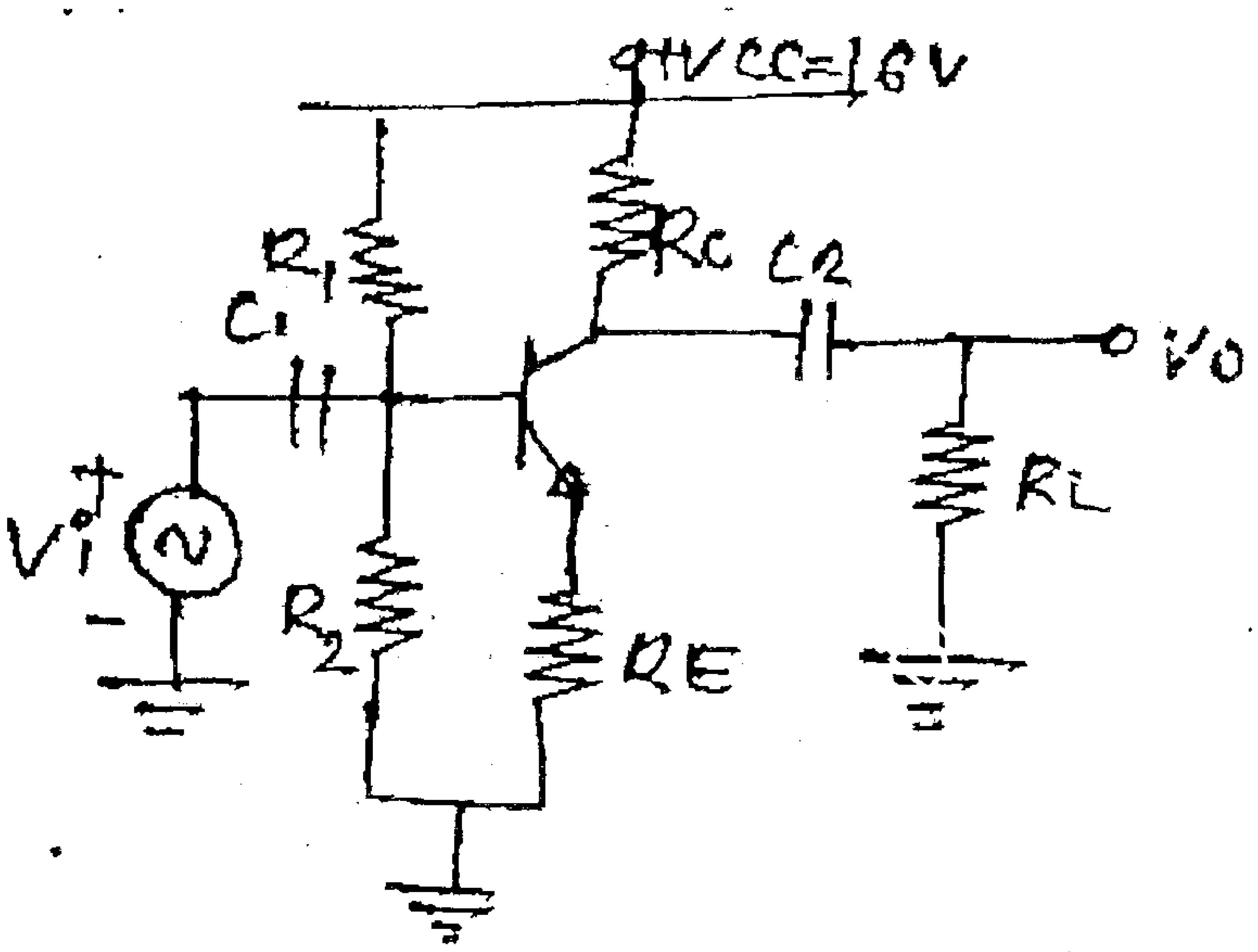
(OLD COURSE) QP Code : **12255**

(3 Hours) [**Total Marks : 100**

N.B. : (1) Questions No. **1** is **compulsory.**
(2) Attempt any **four** questions from remaining.

1. (a) Draw the circuit diagram and explain the operation of dual input balanced output differential amplifier. **20**
(b) Draw the circuit diagram and explain the operation of RC phase shift oscillator.
(c) Design the Rc Phase shift oscillator for 200 Hz. Frequency.
(d) State and explain Barkhausens criteria for oscillator.

2. (a) Derive the equation for zi, zo, Av & Ai for the Ckt shown in figure. **10**



(b) Draw and explain the working of square and triangular waye generator using OP-AMP. **10**

3. (a) Design astable multivibrator using IC-555 for fo 5 KHz and duty cycle of 75% **10**
(b) Draw circuit of instrumentation amplifier and derive gain expression for it. **10**

4. (a) Draw and explain successive Approximation register type ADC. **10**
(b) Explain in detail second order low pass butter worth filter. **10**

5. (a) Design low voltage regulator using IC 723 for the following specification **10**
$V_o = 5V, I_{lmax} = 70mA.$
Vi (unregulated i / p) = 9 ± 10%V
how will you boost the current to a level of 1amp.

6. (a) (i) Describe summing amplifier. **10**
   (ii) Describe zero crossing detector.
   (b) Draw and explain internal architecture of timer IC 555. **10**

7. Write short note on (any **three**) :- **20**
   (a) Active and passive filter.
   (b) Level shifting circuit.
   (c) practical integrator and differentator
   (d) OP-AMP as schmitt circuit.

S-E-IT. Sem-3 (old) 08/12/14

DLDA

(OLD COURSE) **QP Code :12324**

(3 Hours) **[Total Marks : 100**

N.B : (1) Question No. 1 is **compulsory**.
(2) Attempt any **four** out of remaining **six** questions..
(3) **All** questions carry **equal** marks.
(4) Assume suitable data (if required).

1. (a) State and explain De Morgan's Theorem. **5**
(b) Write the excitation table and truth table for SR flip-flop. **5**
(c) Write the hamming code for 1011. **5**
(d) Perform $(829)_{10}$ - $(526)_{10}$ in BCD using 10's complement. **5**

2. (a) Prove that NAND and NOR are universal gates. **10**
(b) Design Binary to Excess-3 code converter. **10**

3. (a) Design two bit Magnitude comparator circuit. **10**
(b) Simplify using K map the logic Expression and draw the logic diagram for the following :— **10**
(i) $AB + ABC + A(B + AB)$
(ii) $F(A, B, C, D) = \sum(0, 1, 4, 5, 6, 9, 10, 12, 15)$

4. (a) Explain 4 bit Bi-directional shift register. What are the uses of register? **10**
(b) Simplify using a Quine Mc Cluskey Method. **10**
$F(A, B, C, D) = \sum M(0, 2, 3, 5, 7, 8, 10, 12, 13, 21, 24, 25, 31)$

5. (a) Design the sequence generator for 1010. **14**
(b) Convert SR flip flop to D flip flop. **6**

6. (a) Explain essential features of VHDL and write a VHDL program for Full adder. **10**
(b) Explain master slave JK flip flop **10**

7. Write short notes on any **two** of the following :—
(a) ALU **10**
(b) CAD Tools **10**
(c) Priority Encoder **10**
(d) PLA and PAL. **10**

S. E I T. (old) Sem 3. 12/12/14.
GUI & DBM

Q.P. Code : 12355

(OLD COURSE)

(3 Hours) **[Total Marks :100**

N.B. : (1) Question No **1** is **compulsory.**
(2) Solve any **4** out of remaining questions.

1. (a) State advantages of Database Management System. **5**
   (b) State ACID properties in transactions. **5**
   (c) Explain Murphy's Law of GUI Design with example **5**
   (d) Explain categories of Data Models. **5**

2. (a) Explain different types of database system users and list the functions of Database Administrator (DBA). **10**
   (b) Explain following relational algebra operators with examples :- **10**
   (i) select
   (ii) project
   (iii) join
   (iv) division
   (v) Cartesian product

3. (a) Explain rules to convert ER model to relational model **10**
   (b) Draw E-R diagram for University Database Management System **10**

4. (a) Define serializability. Explain conflict & view serializability. **10**
   (b) Explain timestamp based protocol. **10**

5. (a) Define following terms with example : **10**
   (i) Super key (ii) Candidate key
   (iii) Primary key (iv) foreign key

   (b) Explain Generalization, specialization and Aggregation with examples. **10**

6. (a) Explain terms ODBC & OLEDB **10**
   (b) Explain deadlock detection & deadlock prevention techniques in database systems **10**

20

7. Write short Note on (any **two**) :–
   (a) Decision making & loop structures in VB.
   (b) In built control and active -x controls in VB.
   (c) COM-DCOM
   (d) Transaction support in SQL
