FIRST MIDTERM EXAM-2024
DIPLOMA IN ELECTRONICS ENGG. (Day)-VI SEM.
ELECTRONICS CIRCUIT DESIGN
DEL-602

Time:1Hour M.M. 15

Answer any TWO questions.

1. (a) Design a universal shunt for a multi range ammeter with ranges 0-1mA, 0-10mA, 0-50mA, and 0-100mA. The basic meter movement has a current of 150uA and internal resistance of 100Ω.

(b) A basic d'Arsonval movement with an internal resistance R_m=100Ω and a full scale current of I_m=1mA is to be converted into a multi range d. c. voltmeter with ranges of 0-10V, 0-50V, 0-250V and 0-500V.Find the values of various resistances using the sensitivity method.

2. (a) A PMMC instrument with FSD current of 100uA. A coil resistance of 100Ω is to converted into voltmeter. Determine the required multiplier resistance, if the voltmeter is to measure 50V at full scale. Also calculate the applied voltage when the instrument indicates 0.8, 0.5, 0.2 of FSD.

(b) A moving coil ammeter has a fixed shunt of 0.02Ω. With a coil resistance of Rm=1000Ω and a potential difference of 500mV across it. Full scale deflection is obtained.

(i) To what shunt current does it correspond.

(ii) Calculate the value of R to give full scale deflection when shunted current I is 10A and also 75A.

(iii) With what value of R, 40% deflection obtained with I=100A.

3. (a) A 50Ω basic movement requiring a full scale current of 1mA is to be used as series ohmmeter. The internal battery voltage is 3V. A half scale deflection marking desired is 1000Ω. Calculate

i)Values of R1 and R2

ii)Maximum value of R2 to compensate for 5% drop in battery voltage

(b) A shunt type ohmmeter has a D'Arsonval movement of resistance 2Ω. Its full scale deflection current is 10mA and the battery voltage is 3V. Determine the value of current limiting resistor so that the meter indicates 0.5Ω at the midpoint of its scale.

FIRST MIDTERM EXAM-2019
DIPLOMA IN ELECTRONICS & COMMUNICATION ENGG. VIth SEMESTER
ELECTRONIC CIRCUIT DESIGN DEL602

Time: 1 Hour M.M. 15

Note: Attempt any two questions.

1. (a) Explain the sensitivity of voltmeter. Derive the resistance of multipliers of voltmeter using sensitivity method.

(b) The coil of a measuring instrument has a resistance of 1.0 Ω and the instrument has a full scale deflection of 250V when a resistance of 4999 Ω is connected in series with it, find; (i) The current range of the instrument when used as an ammeter with the coil connected across a shunt of $\frac{1}{499\Omega}$, (ii) the value of the shunt resistance for the instrument to give a full scale deflection of 50A

2. Design a series type ohmmeter. The movement to be used requires 0.5mA for full scale deflection and has an internal resistance of 50Ω. The internal battery has a voltage of 3V .The desired value of half scale resistance is 3000Ω .Calculate
(i) The value of series and parallel resistance R_1 and R_2, (ii) The range of value of R_2, if the battery voltage may vary from 2.7V to3.1V. Use the value R_1 calculated in (i).

3. A PMMC instrument with FSD=50μA and R_m=1700Ω is to be employed as voltmeter with ranges of 10v, 50v and 100v. Calculate the required values of multiplier resistors using the potential divider arrangement.

SECOND MIDTERM EXAM-2019
DIPLOMA IN ELECTRONICS ENGG. (Day)-VI SEM.
ELECTRONICS CIRCUIT DESIGN
DEL-602

Time: 1 Hour M.M. 15

Answer any one question.

1. (a) A full wave rectifier circuit uses a capacitor input filter with 500 μF capacitor and provides a load current of 200mA at 8% ripple. Calculate
(i) dc voltage across filter capacitor V_{dc}
(ii) the peak rectified voltage obtained from 50Hz supply V_m

(b) Design a power supply using Pi section filter to give the d.c. output of 30V at 120mA with ripple factor not exceeding 0.02.

2. (a) A Zener shunt voltage regulator is desired which will provide an output voltage of $V_z = 25V$ dc to a load whose maximum current drain will be $I_{Lmax} = 150mA$. The input voltage to the regulator is expected to vary from $Vi(min) = 50V$ to $Vi(max) = 75V$ dc. Find(a) the minimum power rating required of the Zener diode; (b) the range of values of R (i.e. R_{min} and R_{max}) if a Zener diode is to be used which has a power rating $P_{max} = 30W$.

(b) A half wave rectifier operated from a 50Hz supply uses a 100μF capacitor connected across the load for the rectifier. Calculate the minimum value of the load resistance that can be connected across the capacitor if the ripple is not to exceed 5%.

SECOND MIDTERM EXAM-2023
DIPLOMA IN ELECTRONICS ENGG. (Day)-VI SEM.
ELECTRONICS CIRCUIT DESIGN
DEL-602

M.M. 15

Time:1Hour

Answer any one question.

1. (a) Design a full wave rectifier using a bridge rectifier to supply load current of 100mA= 25mA at 250V with ripple voltage less than 10V. Use LC filter.

(b) Design a power supply using Pi section filter to give the d.c. output of 30V at 120mA with ripple factor not exceeding 0.02.

2. (a)Design an emitter follower voltage regulator to meet the following

$20V<Vi<30V$: $Vo=10V$

$0<IL\leq 1A$: Assume $hFE=25$

$Izmin=10mA$: $Rz=10\Omega$. Neglect VBEdrop

(b) A half wave rectifier operated from a 50Hz supply uses a 100μF capacitor connected across the load for the rectifier. Calculate the minimum value of the load resistance that can be connected across the capacitor if the ripple is not to exceed 5%.

$RL=1154.7\Omega$

21/10/2022

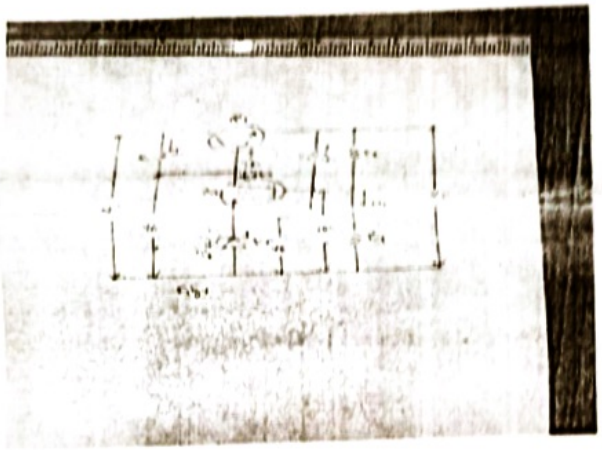
SECOND MIDTERM EXAM-2024
DIPLOMA IN ELECTRONICS ENGG. (Day)-VI SEM
ELECTRONICS CIRCUIT DESIGN
DEL-602

Time:1Hour M.M. 15

Answer any one question.

Q.1 (a) Design a full wave rectifier to supply load current of 100mA±25mA at 250V with ripple voltage less than 10V. Use LC filter. Line frequency f= 50 Hz.

(b) Design a series type voltage regulator in Fig.1 (below) to operate from a supply20V and provide an output of 12V with a maximum load current of 40mA.



Q.2 (a) Design a transistor shunt regulator for unregulated DC supply with 18 Ω of internal resistance. The unregulated power supply varies between 15V to 30V. The regulated output voltage varies between 7V to 7.5V and load current changes from 0 to 100mA. Neglect V_{BE}. Assume the data wherever is required.

(b) Obtain the expression for ripple factor in the case of FWR Circuit with CLC or π-filter.

Code No. DEL-602 Roll No: 21DEL021

Diploma in Electronics Engg. (Day) Semester-VI Examination 2024

Electronic Circuit Design

Paper No.: DEL-602

Time: Three Hours

Max. Marks: 60

(Write your Roll No. on the top immediately on receipt of this question paper)

Note: *Answer all questions. Any missing data (if any) may be assumed suitably. All questions have equal marks.*

1. (a)A moving coil ammeter has a fixed shunt of 0.02Ω. With a coil resistance of Rm=1000Ω and a potential difference of 500mV across it. Full scale deflection is obtained. (6)
(i) To what shunt current does it correspond.
(ii) Calculate the value of R to give full scale deflection when shunted current I is 10A and also 75A.
(iii) With what value of R, 40% deflection obtained with I=100A.

(b) A shunt type ohmmeter has D' Arsonval movement of resistance 2Ω. Its full scale deflection current is 10mA and the battery voltage is 3V. Determine the value of current limiting resistor so that the meter indicates 0.5Ω at the midpoint of its scale. (6)

OR

1'. Design a power transformer to operate at 220V, 50Hz supply to have secondary of 6.5V at 3A. The efficiency of the transformer should be 90%. Make suitable assumptions wherever needed. (12)

2. (a) Design a full wave rectifier to supply load current of 100mA±25mA at 250V with ripple voltage less than 10V. Use LC filter. Line frequency f= 50 Hz. (6)

(b)Design a series type voltage regulator to operate from a supply20V and provide an output of 12V with a maximum load current of 40mA. (6)

OR

2'. (a)Design a transistor shunt regulator for unregulated DC supply with 18 Ω of internal resistance. The unregulated power supply varies between 15V to 30V. The regulated output voltage varies between 7V to 7.5V and load current changes from 0 to 100mA. Neglect V_{BE}. Assume the data wherever is required. (6)
(b) Obtain the expression for ripple factor in the case of FWR Circuit with CLC or π-filter. (6)

3. Design a transistor amplifying stage to meet the following requirements: (12)

Frequency response	:	50Hz -50KHz
Load resistance	:	1kΩ
Input impedance	:	No requirements
Power gain	:	10

Source characteristics	:	R_s=100Ω, v_s=0-20mV
Temperature	:	20±5°C
Power supply	:	9V

Use Ac 127NPN germanium transistor whose value of parameters are as follows:

rbb^1=300 Ω,	rce=16.7 KΩ
rb^1e=4 KΩ,	rb^1c=2.85 MΩ
gm=0.0385 mho,	cb^1c= 9 pF
cb^1e=750 pF,	hfe=100
S= 3.	

Assume any missing data if required

OR

3[1]. Design a complementary symmetry audio power amplifier which delivers 0.5W to a load. Assume the suitable values wherever needed. The lower cut off frequency is f_i =20 Hz. (12)

4. (a) Design a transistorized Hartley's oscillator to be operated at 5MHz. Consider the following specifications. (6)

V_{CC}=12 V	L_{rfc}=1mH
R_E=750 Ω	h_{fe}=100
S=5	A_{vmin}=5
L_1=20 μH	

Use NPN silicon transistor.

(b) (i)Draw the circuit of monostable multivibrator using transistors and obtain the expressions for various components. (6)

(ii) Design a monostable multivibrator is used to develop output pulse with delay of 141μsec.after the application of trigger pulse with transistor. The values are given as:

h_{fe}=17; $I_{C(max)}$=75mA; V_{CC}=25V

5. (a) Draw the circuit diagram of Schmitt Trigger circuit using operational amplifier Explain its operation. (6)

(b) Derive the expression for the time period of astable multivibrator. (6)

Code No. DEL-602 Roll No: 20DEL037

Diploma in Electronics Engineering Semester-VI Examination 2022-2023

Electronics Circuit Design

Paper No.: DEL-602

Time: Three Hours

Max. Marks: 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Note: *Answer all questions. Any missing data (if any) may be assumed suitably. All questions have equal marks.*

1. (a) Explain the sensitivity of voltmeter. Derive resistance of multiplier of voltmeter using sensitivity method. (6)

(b) A moving coil voltmeter has resistance of 100 Ω. The scale is divided into 150 equal divisions. When a potential difference of 1V is applied to the terminals of the voltmeter, a deflection of 100 divisions is obtained. Explain how the instrument could be used for measuring up to 300V. (6)

OR

1¹. Design a power transformer to operate at 220V, 50Hz supply to have secondary of 6.5V at 3A. The efficiency of the transformer should be 90%. Make suitable assumptions wherever needed. (12)

2. (a) Design a full wave rectifier using a bridge rectifier to supply load current of 100mA± 25mA at 250V with ripple voltage less than 10V. Use LC filter. (6)

(b) Design a power supply using Pi section filter to give the d.c. output of 30V at 120mA with ripple factor not exceeding 0.02. (6)

OR

2¹. Design an emitter follower voltage regulator to meet the following specifications: (12)

$20\ V < V_{ir} > 30\ V$; $V_{or}=10\ V$

$0 < I_L > 1A$

$h_{FE(min)}=25$; $I_{Z(min)}=10\ mA$

$R_Z=10\ \Omega$

3. Design a transistor amplifying stage to meet the following requirements: (12)

Frequency response	:	30Hz -15 KHz
Load resistance	:	5kΩ
Input impedance	:	No requirements
Voltage gain	:	40minimum,load voltage to source voltage ratio
Source characteristics	:	R_s=100Ω, v_s=0-20mV
Temperature	:	20±5°C
Power supply	:	8V

Use Ac 127NPN germanium transistor whose value of parameters are as follows:

rbb^1=300Ω,	rce=16.7KΩ
rb^1e=4000Ω,	rb^1c=2.85MΩ
g_m =0.0385mho,	cb^1c=9pF
cb^1e=750pF,	hfe=100
S=3.	

Assume any missing data if required

OR

3[1]. Design a complementary symmetry audio power amplifier which delivers 0.5W to a load. Assume the suitable values wherever needed. The lower cut off frequency is f_i=20Hz. (12)

4. (a) Design a transistorized Hartley's oscillator to be operated at 5MHz. Consider the following specifications. (6)

V_{CC}=12V	;	L_{rfc}=1mH
R_E=750 Ω	;	h_{fe}=100
S=5	;	A_{vmin}=5
L_1=20μF		

Use NPN silicon transistor.

(b) Design an astable multivibrator for output amplitude of 15V. The output to be pulse of 20μsec and the time between the pulses to be 10μsec. Use NPN transistor (Si) with $I_{C(sat)}$=10mA, $h_{fe(min)}$ = 50 . (6)

5. (a) Draw the circuit diagram of Schmitt Trigger using op-amp and explain its operation. Explain its threshold points. (6)

(b) Calculate the circuit frequency of oscillation of op-amp astable multivibrator. The component values are C=0.01μF, R_f =50K Ω, R_1 =35K Ω and R_2 =30K Ω. (6)

Code No. DEL-602 Roll No: ----------

Diploma in Electronics Engineering Semester-VI Examination 2021

Electronics Circuit Design

Paper No.: DEL-602

Time: Three Hours

Max. Marks: 60

(Write your Roll No. on the top immediately on receipt of this question paper.)

Note: *Answer all questions. Any missing data (if any) may be assumed suitably. All questions have equal marks.*

1. (a) An ammeter has a PMMC instrument with a coil resistance of Rm=99 Ω and FSD current of 0.1mA. Shunt resistance Rs =1Ω. Determine the total current passing through the ammeter at: (6)
   i) FSD
   ii) 0.5FSD and
   iii) 0.25FSD,

   (b) Design a multi range d.c. voltmeter using potential divider arrangement. A basic d'Arsonval movement with an internal resistance of 50Ω and full deflection current of 2mA. The voltage ranges are 0-10V, 0-50V, 0-100V and 0-250V. (6)

   OR

1'. Design a power transformer to operate at 220V, 50Hz supply to have secondary of 6.5V at 3A.The efficiency of the transformer should be 90%. Make suitable assumptions wherever needed. (12)

2. (a) Calculate the size of capacitor needed to obtain a ripple of 10% at a load current of 15mA to a d.c. load of 10kΩ. What is the PIV of the diodes used for full wave rectifier circuit. (6)

   (b) Design a power supply using Pi section filter to give the d.c. output of 50V at 100mA with ripple not to exceed 1%. (6)

   OR

2'. Design a transistor shunt regulator for unregulated supply with 18 ohm of internal resistance gives output between 15V to 30V and regulated output voltage varies between 7V and 7.5V and load current changes from 0 to 100mA. Neglect the V_{BE}. (12)

3. Design a transistor amplifying stage to meet the following requirements: (12)

Frequency response	:	50Hz -50KHz
Load resistance	:	1kΩ
Input impedance	:	No requirements
Power gain	:	10
Source characteristics	:	R_s=100Ω, v_s=0-20mV
Temperature	:	20±5°C
Power supply	:	9V

Use Ac 127NPN germanium transistor whose value of parameters are as follows:

rbb^1=300Ω,	rce=16.7KΩ
rb^1e=4000Ω,	rb^1c=2.85MΩ
gm=0.0385mho,	cb^1c=9pF
cb^1e=750pF,	hfe=100
S=3,	

Assume any missing data if required

OR

3'. Design a complementary symmetry audio power amplifier which delivers 0.5W to a load. Assume the suitable values wherever needed. The lower cut off frequency is f_i=20Hz. (12)

4. (a)Design a transistorized Colpitt's oscillator to be operated at 5MHz. Consider the following specifications. (6)

V_{CC}=12V	L_{eff}=1mH
R_E=750Ohm	h_{fe}=100
S=5	A_{vmin}=5
C_1=500pF	

Use NPN silicon transistor.

(b) Design an astable multivibrator for output amplitude of 15V. The output to be pulse of 20µsec and the time between the pulses to be 10µsec.Use NPN transistor (Si) with $I_{C(sat)}$=10mA, $h_{fe(min)}$ = 50 . (6)

5. (a) Draw the circuit diagram of an astable multivibrator using operational amplifier. Explain its operation. (6)

   (b) Determine the upper and lower trigger points in the inverting Schmitt trigger circuit for R_1=68kΩ and R_2=82kΩ. The maximum output voltage levels are ±5V. (6)