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(21214)

Roll No.

B.Tech. V Sem.

TU-87(N)

B.Tech. Examination, Dec - 2014

EC, CS, EI

Engineering & Managerial Economics

BT-501(N)

Time : Three Hours]

/ Maximum Marks : 100

Note: Attempt all questions. All questions carry equal marks.

1. Define economics. Differentiate between macro and micro economics. 20

OR

Explain the role of science, engineering and technology in economic development of a nation.

P.T.O.

2. What are the various types of demand? Discuss the factors that influence the demand for a commodity.

20

OR

What is the difference between movement along the demand curve and shift in demand.

3. Discuss various methods used for demand forecasting of a new product.

20

OR

What do you mean by supply? Discuss the factors effecting it and law of supply.

4. What are the functions of money? Discuss the evils of money.

20

OR

Discuss the causes behind inflation and the remedies needed to control it.

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5. Attempt any **two** parts : $2 \times 10 = 20$

- (a) Evolution of management thought
- (b) Advantages and disadvantages of bureaucratic organization
- (c) Jauhari window framework
- (d) Concept of transactional analysis

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Roll No.

B.Tech.-V Sem.

TU-88(N)

B. Tech. Examination, Dec. 2014

(EC & EI Branch)

Integrated Circuits

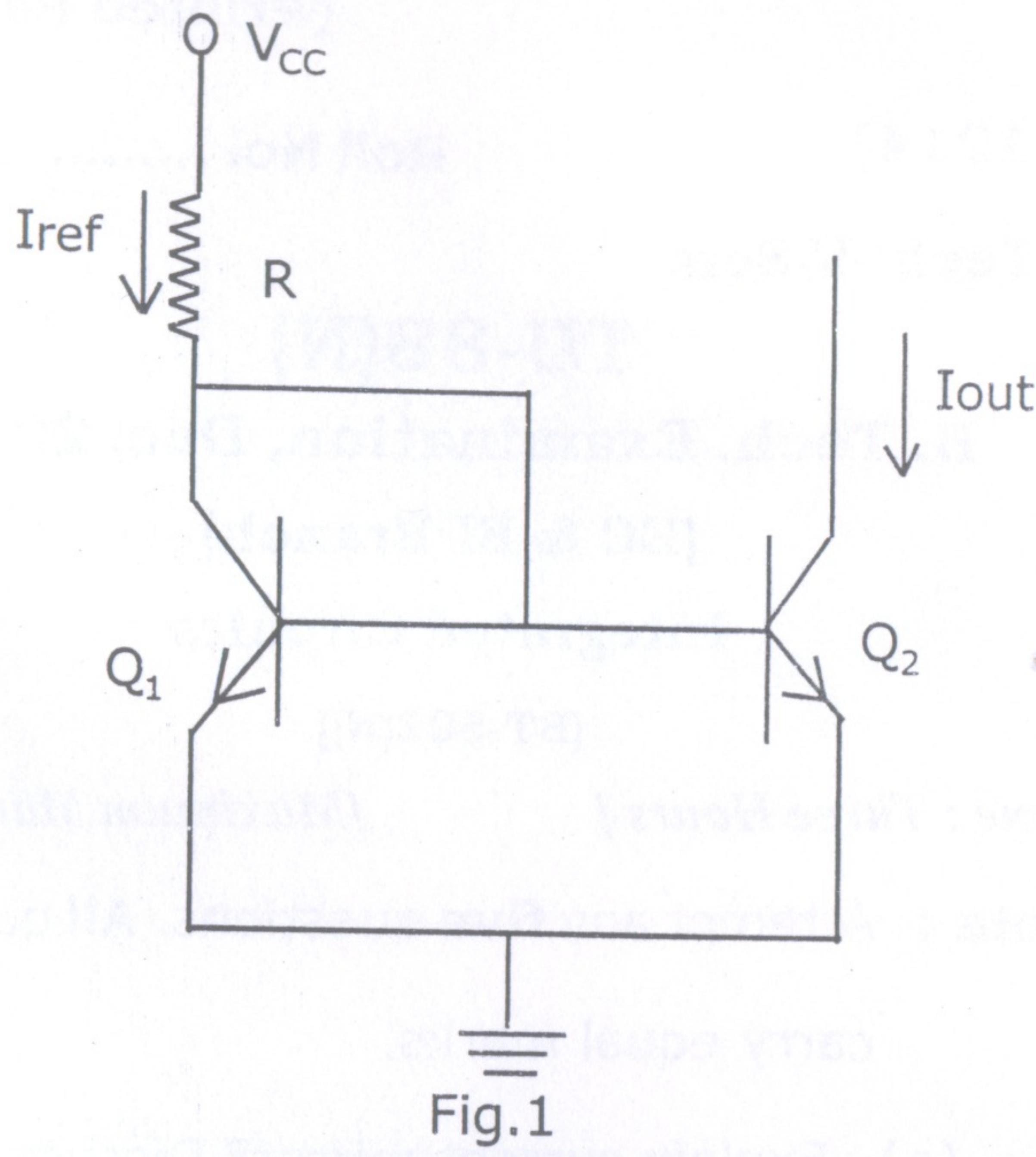
[BT-502(N)]

Time : Three Hours / Maximum Marks : 100

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) Explain current mirror? Discuss the advantages of three transistor current source. For a two transistor current source as shown in Fig. 1, the circuit parameters are $V_{CC}=10V$, $R=20K\Omega$, $V_{BE}=0.7V$ & $\beta=100$. Determine I_{ref} and I_{out} .

P.T.O.



- (b) Explain Wilson current source? For a Wilson current source show that biasing current is equal to reference current. use $\beta = 100$. 10
2. (a) Discuss various DC characteristics of an op-amp. List all the features of op-amp 741. 10

(b) Explain slow rate, CMRR, Gain band width product. The slow rate of an up-amp is $6V/\mu\text{sec}$. When closed loop gain is unity the amplified output is observed to be a pure sinusoid $v_0 = V_m \cos \omega t$ provided the frequency of this signal does not exceed a certain limit. Find the value of limiting frequency before the output signal is distorted by the slow rate limit if, 10

- (i) $V_m = 1V$
(ii) $V_m = 5V$.

3. (a) What are the limitation of an ordinary op-amp differentiator. Draw the circuit of practical differentiator that will eliminate there limitations? 10
- (b) Determine V_{out} for the circuit as shown

in fig. 2.

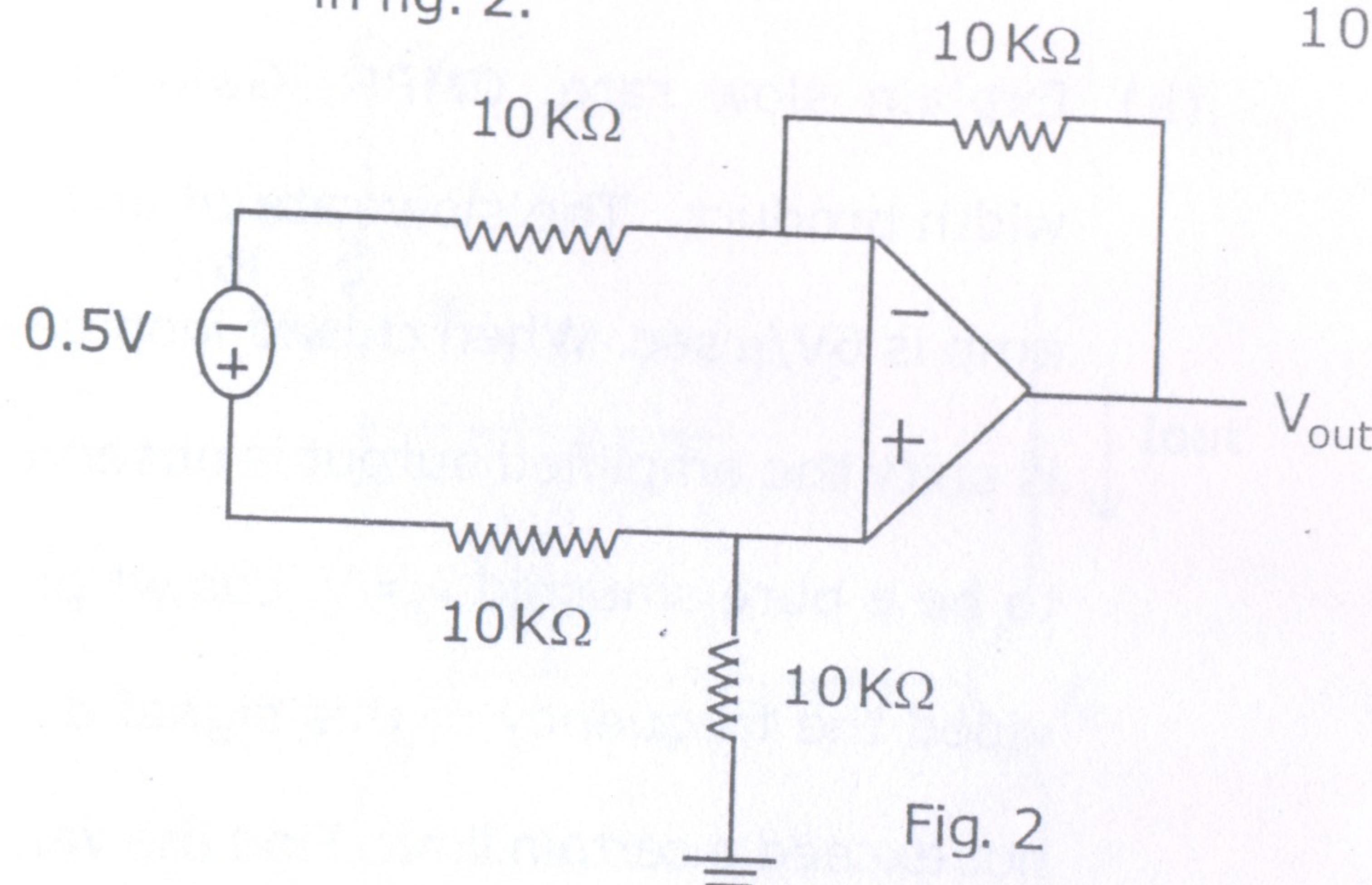


Fig. 2

4. (a) Draw the circuit of RC phase shift oscillator and Explain it. Design of an RC phase shift oscillator for oscillation frequency of 600 Hz. 10

- (b) Design a first order low pass filter for following specification : Cutoff frequency = 3KHz, pass band gain = 2. 10

5. (a) Implement two input AND & OR gate using CMOS inverter? 10

- (b) Implement SR & D Flip flop using CMOS inverter? 10

6. (a) Explain the advantages of CMOS inverter with respect to other inverter? What are the difference between latch & Flip Flop. 10

- (b) Draw and explain state variable filter? 10

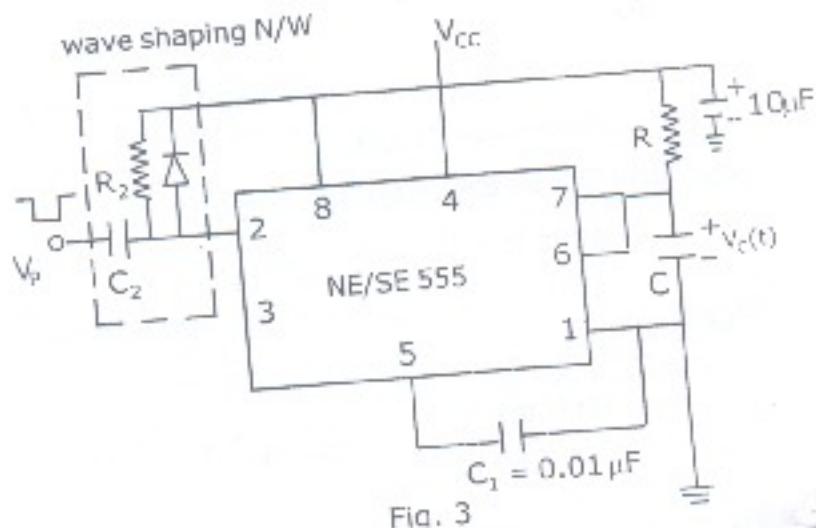
7. (a) Give the circuit of a log amplifier and show how the circuit compensates the effect of temperature? 10

- (b) Explain how a full wave precision full wave rectifier can be used as an absolute value circuit. 10

8. (a) Draw and explain the operation of sample and hold circuit? 10

- (b) Sketch the circuit and characteristics of basic schmitt trigger. What are the advantages of a schmitt trigger circuit. 10

9. (a) Draw and explain the working of phase locked loop? 10
- (b) Draw and explain the circuit of PLL FM demodulator. 10
10. (a) Describe two basic modes in 555 timer operations. Explain the difference between two operating modes. 10
- (b) Design a monostable multivibrator using 555 timer IC in Fig. 3 so that $t_n = 2.5 \text{ m sec.}$ use $V_{CC} = 12V.$ 10



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Roll No.

B.Tech.-V Sem.

TU-89(N)

B. Tech. Examination, Dec. 2014

E.C./E.I.

Principles of Communications

BT-503(N)

Time : Three Hours / Maximum Marks : 100

Note : (i) Attempt any **five** questions. Each questions carry equal marks.
(ii) Show proper steps in derivation and calculations.

1. (a) What is base band signal? Why modification of signal required for transmission over channel? 10.
(b) A 3500Hz audio tone amplitude modulates a 200 KHz carrier resulting in a modulated signal having percent of modulation is 85%, the total power being transmitted is 15KW. Determine the power content at each of the frequency that appears in a spectrum analysis of modulated wave. 10

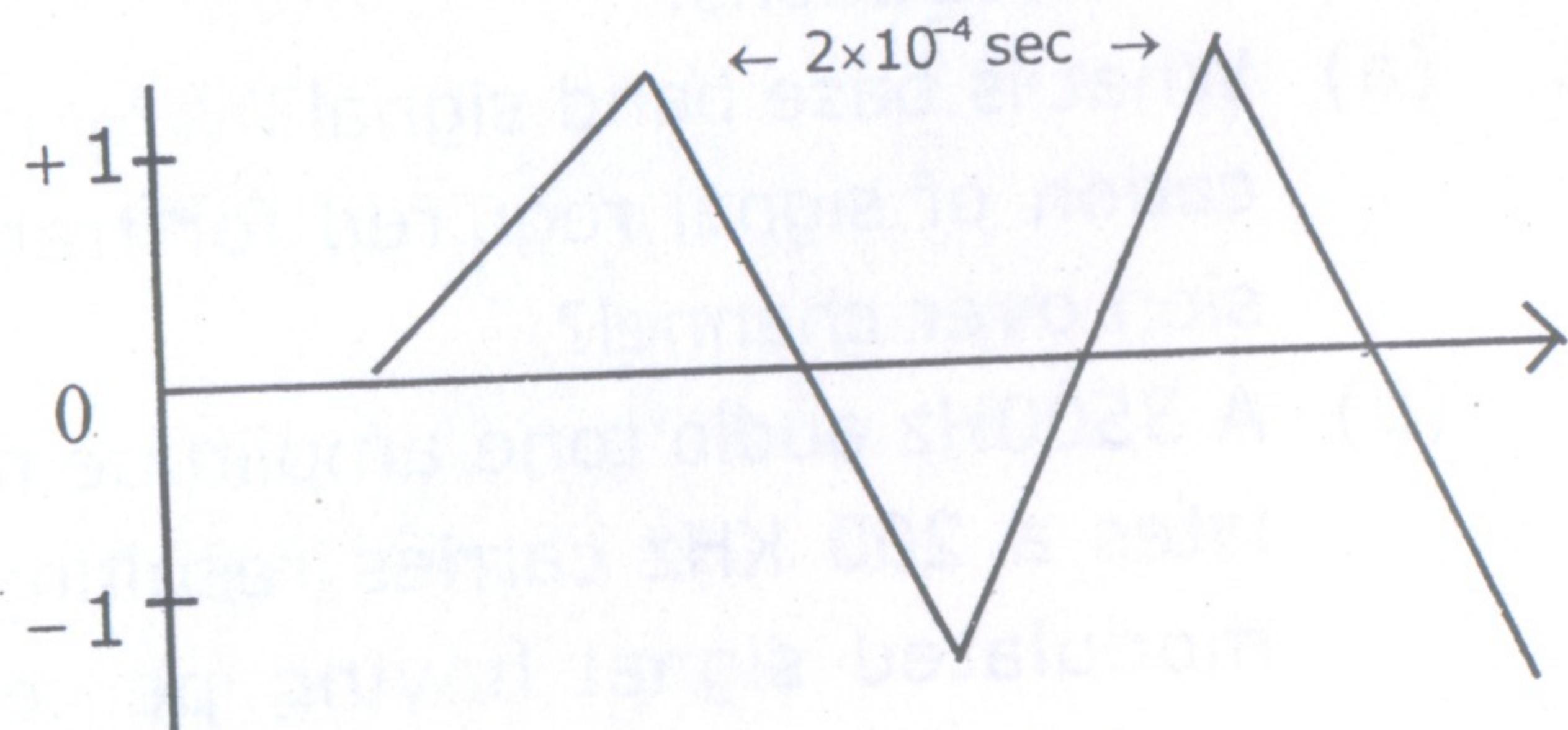
P.T.O.

2. Compare the following amplitude modulation system for transmission/reception efficiencies and give their applications. 20

- (i) DSB
- (ii) DSB/SC
- (iii) SSB with reduced carrier
- (iv) VSB

3. A sinusoidal carrier wave of frequency of $F_c = 100\text{MHz}$ is exponentially modulating signal $x(t)$. It has shown in (Figure-1). Find the bandwidth when resulting signal is :

- (i) FM with sensitivity $K_f = 10^5 \text{ Hz/volt}$
- (ii) PM with sensitivity $K_p = 10^\pi \text{ radian/volt}$.



(Figure-1)

3. Prove that the phase discriminator is an AM demodulator. Why was the ratio detector derived from the phase discriminator? How is the balance ratio detector an improve-

ment over basic circuit? 20

5. A signal $g(t) = Smc^2(5\pi t)$ is sampled (using uniformly spaced impulses) at the rate of

- (i) 5Hz
- (ii) 10 Hz
- (iii) 20 Hz for each of three cases.
- (a) Sketch the sampled signal
- (b) Sketch the spectrum of sampled signal
- (c) Explain whether you can recover the signal $g(t)$ from the sampled signal.
- (d) If sampled signal pass through an ideal low pass filter of bandwidth 5Hz. Sketch the spectrum of output signal.

6. (a) Why line coding is required in communication? Discuss power spectral density of followings : 10

- (i) Polar NRZ
- (ii) Unipolar RZ
- (iii) AMI
- (iv) Manchester

(b) With the help of neat circuit diagram, Explain generation and detection of a PPM signal. 10

7. Discuss operation of DPCM transmitter and receiver. What is the role of a predictor in it? Comment on importance of prediction gain. 20
8. What is the significance of word Adaptive in ADM? Explain step size adjustment in Adaptive Delta Modulation. With the help of neat block diagram discuss working of ADM Transmitter. 20
9. (a) A cas code two stage amplifier has been shown in (figure-2). Find out overall noise-figure in dB. 10
- 
- (Figure-2)
- (b) Why pre-emphasis and De-emphasis required? And how SNR can be improved? 10
10. In respect of phase-locked-loop (PLL) discuss in detail. 20
- (i) Free running state
 - (ii) Lock in Range
 - (iii) Capture Range
 - (iv) Pull-in-Time

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Roll No.

B.Tech. V Sem.

TU-90 (N)

B.Tech. Examination, Dec. 2014

E.C., E.I.

Microprocessors

BT-504 (N)

Time : Two Hours / Maximum Marks : 50

Note: Attempt any **five** questions. Each 10 marks.

1. Draw the architecture of 8085 microprocessor and explain its operation. 10
2. What is difference between microprocessor and microcontroller. Write the application of microprocessor. 10

P.T.O.

3. Write a program in assembly language using
looping and counting. 10

4. What is advance subroutine concepts and
write instructions for conditional call, return
and 16 bit arithmetic instruction. 10

5. Draw Block diagram and Pin diagram of 8086
microprocessor. 10

6. Explain interfacing keyboard and seven seg-
ment display. 10

7. Explain Direct Memory Access and 8237 DMA
controller. 10

8. Write the program of the following. 10
(a) BCD to Binary conversion.
(b) BCD addition.

9. Explain 8255 PPI and 8259A programmable
interrupt controller. 10

10. Explain the following : 10

- (a) Debugging counter
- (b) Zero - to - nine
- (c) Module ten counter
- (d) Logic operation.

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Roll No.

B.Tech. V Sem.

TU-90 (N)

B.Tech. Examination, Dec. 2014

E.C., E.I.

Microprocessors

BT-504 (N)

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P.T.O.

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Roll No.

B.Tech.-V Sem.

TU-91(N)

B. Tech. Examination, Dec. 2014

E.C.& E.I.

Control System-I

BT-505(N)

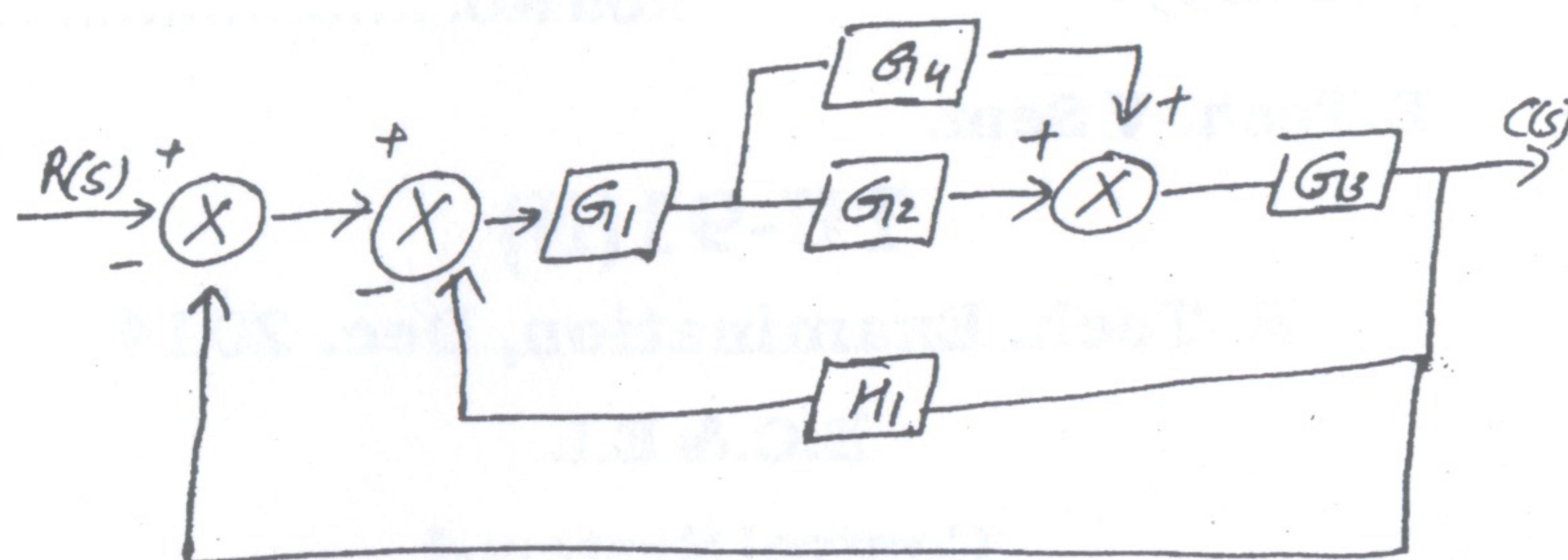
Time : Three Hours] [Maximum Marks : 100

Note : Attempt any **five** questions. All questions carry equal marks.

1. (a) What do you mean by feedback control system? What are the basic component of closed loop control system? Discuss the function of these components?
(b) Write Force-Voltage and force current analogy.
2. Draw the signal flow graph for the system shown below & hence obtain the transfer

P.T.O.

function using mason's gain formula. 20



3. Develop the state space model for a system whose dynamics is represented by the following eqn. 20

$$\frac{d^3y(t)}{dt^3} + 3\frac{d^2y(t)}{dt^2} + 5\frac{dy(t)}{dt} + 7y(t) = 114(t)$$

4. A system is characterized by the following state space equation : 20

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u \quad t > 0$$

$$y = [1 \ 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

(a) Find the transfer function of the system.

(b) Compute state transition matrix.

(c) Solve the state eqⁿ. for a unit step input under zero Initial condition. 20

5. Drive the expression of unit step response of a typical 1st order system plot the response. What do you mean by time constant. 20

6. Give the definition of the error constants K_p, K_v, K_a? What are the effects of adding a pole & adding a zero to a

(i) First order

(ii) Second order system 20

7. State and Explain Routh's stability criterion.

What are the limitation of Routh Hurwitz criteria? 20

8. Using Routh Hurwitz Criteria find the stability
of the following characteristics eqⁿ.

(1) $S^4 + 6S^3 + 21S^2 + 36S + 20 = 0$

(2) $S^5 + S^4 + 2S^3 + 2S^2 + 3S + 5 = 0$

9. Draw the bode plot of the following system

$$G(S)H(S) = \frac{L(S + 0.25)}{S^2(S + 1)(S + 0.5)}$$

Find out Gain margin and phase margin of
the graph and comment on stability. 20

10. Write short notes on 20

- (a) Nyquist contour
- (b) Principle of argument

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Roll No.

B.Tech. V Sem.

TU-92 (N)

B.Tech. Examination, Dec. 2014

E.C.E.I. Branch

Antenna Wave Propagation

BT-506 (N)

Time : Two Hours]

/Maximum Marks : 50

Note : Attempt any five questions. All questions carry

equal marks. Use of calculator is allowed.

1. Define Radiation intensity and beam efficiency.
Relate Directivity D and gain G.
2. Define antenna Temperature and antenna impedance.
3. Derive Friiss transmission formula.
4. Explain Antenna action define any its four parameter.

P.T.O.

5. What is meant by directivity and power gain of an antenna? Show how the directivity can be increased by using a number of Antennas in a suitable array.
6. Show relation between directivity and resolution.
7. Drive the Lorentz condition (Equation).
8. Write short notes on :
- (i) Hertzian dipole
 - (ii) Short Electric dipole
 - (iii) HPBW and FNBW
 - (iv) Reciprocity theorem
 - (v) Antenna Temperature
9. Explain of following :
- (i) Gain of an antenna
 - (ii) Directivity
 - (iii) Radiation resistance
 - (iv) Radiation intensity
 - (v) Effective area
10. What do you mean by Antenna? Define areas of it's applications? and why we need Maxwell equation?

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Roll No.

B.Tech.-V Sem.

TU-93(N)

B. Tech. Examination, Dec. 2014

E.I. BRANCH

Fluid Mechanics

BT-507(N)

Time : Three Hours] [Maximum Marks : 100

Note : Solve any **five** questions.

1. (a) Define the following term : 2×5
- (i) Specific Gravity
 - (ii) Manometer
 - (iii) Newtonian Fluid
 - (iv) Centre of Pressure
 - (v) Buoyancy
- (b) Sketch and Explain u-tube differential manometer. 10

P.T.O.

2. (a) State and Prove the Pascal's Law. 10
(b) What do you understand by Total Pressure and Centre of Pressure. 10
3. (a) What are the conditions of equilibrium of a floating body and a submerged body. 10
(b) A wooden log of 0.6m diameter and 5m length is floating in a River water. Find the depth of the Wooden log in Water when the S.P. Gravity of the log is 0.7. 10
4. (a) Define the following and give the Practical example for each :
(i) Turbulent Flow
(ii) Steady Flow
(b) Differentiate between forced vortex and free vortex flow. 10
5. (a) Derive an expression for continuity equation in cylindrical polar co-ordinate. 10
- (b) The Diameters of a Pipe at the Section 1 and 2 are 10 cm and 15 cm respectively. Find the discharge through the pipe if the velocity of water flowing through the pipe at section 1 is 5 m/sec. Determine also the velocity at Section 2. 10
6. (a) Derive an expression for rate of flow through orifice ineter. 10
(b) Explain in brief What is pitot tube. 10
7. A closed tank partially filled with water up to height of 0.9m having an orifice of diameter 15mm at the bottom of the tank. The Air is Pumped in to the upper part of the tank. Determine the pressure required for a discharge of 1.5 litres/s through the orifice. Take $C_d = 0.62$.

8. Find an expression for loss of head of a viscous fluid flowing through a circular pipe. 20
9. (a) State Buckingham's π -theorem. Why this theorem is considered Superior over the Payleigh's Method for Dimensional Analysis. 10
- (b) Explain the term, 'dimensionally Homogeneous equation'. 10
10. The pressure difference ΔP in a Pipe of Diameter D and length l due to turbulent flow depends on the velocity v , viscosity μ , density ρ and roughness K using Buckingham's π -theorem, obtain an expression for ΔP . 20

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Roll No.

B.Tech. V Sem.

TU-94 (N)

B.Tech. Examination, Dec. 2014

E.I.

Industrial Instrumentation

BT-508 (N)

Time : Two Hours]

[Maximum Marks : 50

Note : Attempt any **five** questions. Calculator
may be used.

1. Draw and describe the working of pressure sensitive primary devices.

A flat circular diaphragm of mild steel has a diameter of 15 mm. For mild steel, Young's modulus = 200 GN/m² and poisson's ratio = 0.28.

Find the thickness of diaphragm if the maximum stress is not to exceed 300 MN/m² when the

P.T.O.

- applied pressure is 300 kN/m^2 . Find the deflection at centre for a pressure of 150 kN/m^2 .
2. Describe the method for measurement of temperature with the use of :
(i) RTDs
(ii) Thermistors and
(iii) IC sensors.
3. Describe the construction, principle of working and applications of Hall Effect Transducers.
4. Define a digital transducer and explain its applications for measurement of linear and angular displacement.
5. What are various Gauges used to measure the pressure below atmospheric pressure.
Draw and describe the working of Pirani Gauge.
6. Draw and describe various types of Manometers.
7. Define absolute and Kinematic viscosity and describe the working of Industrial Viscosity meter with neat diagram.
8. Draw and describe the loading cells. Describe the working of Tension compression Resistance Strain Gauge Cell.
9. Explain Electrical and Chemical method for measurement of Moisture.
10. (a) What do you mean by piezoelectric transducer? Explain its working.
(b) Describe the working of thermocouple gauge.