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10AL51

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Management and Entrepreneurship

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define management. List its characteristics. **(04 Marks)**
b. What are the various roles of a manager? Explain. **(06 Marks)**
c. Explain (i) Systems approach (ii) contingency approach to Management. **(10 Marks)**

2 a. Define the term planning. Explain steps involved in planning. **(10 Marks)**
b. List the importance and purpose of planning process. **(06 Marks)**
c. Explain MBO and MBE. **(04 Marks)**

3 a. List and explain principles of organization. **(10 Marks)**
b. Explain selection and recruitment process. **(10 Marks)**

4 a. Explain the following theories of motivation:
(i) Maslow's Hierarchy of needs theory (ii) McGregor's theory (iii) 2 factor theory **(12 Marks)**
b. List the techniques of coordination. **(08 Marks)**

PART – B

5 a. Classify Entrepreneurs by providing an example for each type. **(10 Marks)**
b. What role does an entrepreneur play in economic development of a country? **(10 Marks)**

6 a. Explain the steps to start a SSI. **(08 Marks)**
b. List the advantages of a SSI. **(05 Marks)**
c. Explain effect of WTO/GATT on SSI. **(07 Marks)**

7 Explain the nature of support and functions of TECKSOK, KIADB, NSIC and KSFC for an entrepreneur. **(20 Marks)**

8 a. Why should feasibility study be conducted? Explain various types of feasibility study. **(12 Marks)**
b. Explain contents of a Project Report. **(08 Marks)**

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10EE52

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Signals and Systems

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Define a signal and a system with examples. **(04 Marks)**

b. Sketch the following signal and determine even and odd components.

$x(n) = (1, 2, \underset{\uparrow}{0}, 1, 2)$ **(06 Marks)**

c. Find the total energy of the signal :

$$x(t) = A \quad ; \quad -\frac{T}{2} \le t \le \frac{T}{2}$$

$$= 0 \quad ; \quad \text{otherwise}$$ **(04 Marks)**

d. Check whether the following signals are periodic or not. If periodic determine their fundamental period.

(i) $x(t) = \cos t + \sin \sqrt{2}\, t$

(ii) $x(n) = \cos(\pi + 0.2n)$ **(06 Marks)**

2 a. Determine whether the system given below is (i) memoryless (ii) Causal (iii) Time invariant (iv) Linear (v) stable

$y(t) = e^{-x(t)}$ **(06 Marks)**

b. Find the response of an L.T.I. system with impulse response $h(n) = \alpha^n u(n)$ for an input signal $x(n) = \beta^n u(u)$; $|\alpha| < 1$ and $|\beta| < 1$. When (i) $\alpha \neq \beta$ and (ii) $\alpha = \beta$. **(10 Marks)**

c. Find the step response for the system whose impulse response $h(t) = t\ u(t)$. **(04 Marks)**

3 a. The impulse response of a system is $h(t) = e^{2t}\ u(t-1)$. Check whether the system is (i) stable (ii) causal (iii) memoryless. **(06 Marks)**

b. The differential equation of the system is given as, $\frac{d^2y(t)}{dt^2} + \frac{3dy(t)}{dt} + 2y(t) = x(t)$

with $y(0) = 1$; $\left.\frac{dy(t)}{dt}\right|_{t=0} = 1$

Determine total response of the system for an input $x(t) = u(t)$. **(08 Marks)**

c. Draw the direct form-I and direct form-II realizations for the system

$$y(n) - \frac{1}{2}y(n-1) + \frac{1}{4}y(n-2) = x(n) + 2x(n-1)$$ **(06 Marks)**

4 a. State and prove the following properties of discrete time fourier series:

(i) Parseval theorem

(ii) Time shift **(10 Marks)**

b. Find the fourier series co-efficients for the periodic signal x(t) with period, 2 sec given by $x(t) = e^{-t}$; for $-1 \le t \le 1$. **(10 Marks)**

PART – B

5 a. State and prove the following properties of continuous time fourier transform :
(i) Convolution (ii) Linearity **(10 Marks)**

b. Find the fourier transform of the following :
$x(t) = \sin(\pi t)\, e^{-2t}\, u(t)$ **(05 Marks)**

c. Find the inverse fourier transform of $X(w) = \dfrac{jw + 12}{(jw)^2 + 5jw + 6}$ **(05 Marks)**

6 a. Find the DTFT of the following signals :

(i) $x(n) = \left(\dfrac{1}{2}\right)^n u(n-2)$

(ii) $x(n) = u(n) - u(n-6)$

(iii) $x(n) = 2^n\, u(-n)$ **(10 Marks)**

b. Obtain the frequency response and impulse response of the system having the output y(n) for the input x(n) as given below:

$$x(n) = \left(\frac{1}{2}\right)^n u(n)$$

$$y(n) = \frac{1}{4}\left(\frac{1}{2}\right)^n u(n) + \left(\frac{1}{4}\right)^n u(n)$$ **(10 Marks)**

7 a. State and prove the following properties of z-transform: **(08 Marks)**
(i) Initial value theorem
(ii) Differentiation in z-domain

b. Find the Z.T. of the following and sketch the R.O.C.S.
(i) $x(n) = a^{n-1}\, u(n)$

(ii) $x(n) = \left(\dfrac{1}{5}\right)^n u(n) + 2^n\, u(-n-1)$ **(06 Marks)**

c. Find the inverse z-transform of $X(z) = \dfrac{z^2 - 3z}{z^2 + \dfrac{3}{2}z - 1}$ using partial fraction expansion method,

ROC : $\dfrac{1}{2} < |z| < 2$. **(06 Marks)**

8 a. A causal discrete time LTI system is described by

$$y(n) - \frac{3}{4}y(n-1) + \frac{1}{8}y(n-2) = x(n)$$

where x(n) and y(n) are the input and output of the system respectively.
(i) Determine the system function H(z)
(ii) Find the impulse response h(n)
(iii) Find the stability of the system **(12 Marks)**

b. Solve the following difference equation for the given initial conditions and input.

$$y(n) - \frac{1}{9}y(n-2) = x(n-1)$$

with $y(-1) = 0$, $y(-2) = 1$ and $x(n) = 3\, u(n)$. Use unilateral z-transformation. **(08 Marks)**

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10EE53

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Transmission and Distribution

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting atleast TWO questions from each part.***

PART – A

1 a. Draw the single line diagram of typical power supply scheme indicating the standard voltages. **(05 Marks)**

b. State the effect of high voltage used in transmission on :
i) Volume of copper required ii) Line efficiency iii) Line voltage drop. **(10 Marks)**

c. Write the comparison between overhead and under ground transmission system. **(05 Marks)**

2 a. Derive the expression for sag in overhead line conductors supported by the towers situated at different levels. **(06 Marks)**

b. Write a note on : i) Stringing chart ii) Sag Template. **(06 Marks)**

c. A transmission line has a span of 200 meters between level supports. The conductor has a cross sectional area of 1.29cm^2, weights 1170 kg/km and has a breaking stress of 4218 kg/cm^2. Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square metre of projected area. What is the vertical sag? **(08 Marks)**

3 a. State the various properties of an insulator. **(05 Marks)**

b. An insulator string consists of three units, each having a safe working voltage of 15 KV. The ratio of self – capacitance to shunt capacitance of each unit is 8:1. Find the maximum safe working voltage of the string. Also find the string efficiency. **(10 Marks)**

c. Write a note on testing of insulators. **(05 Marks)**

4 a. Discuss the different factors affecting Corona. **(06 Marks)**

b. Derive the expression for capacitance of a Single Core Cable. **(06 Marks)**

c. A 66KV single core lead sheathed cable is graded by using two dielectrics of relative permittivity 5 and 3 respectively. Thickness of each being 1cm. The core diameter is 2cm. Determine the maximum stress in the two dielectrics. **(08 Marks)**

PART – B

5 a. Derive an expression for the inductance per phase for a 3 phase over head transmission line when conductors are unsymmetrically placed but the line is completely transposed. **(10 Marks)**

b. Find the inductance per phase per km of double circuit 3 phase line shown in fig. Q5(b). The conductors are transposed and are of radius 0.75cm each. The phase sequence is ABC. **(10 Marks)**

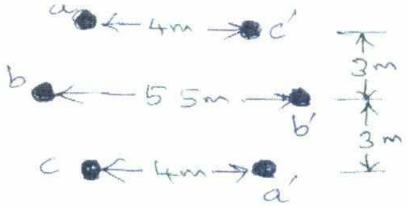

Fig.Q5(b)

6 a. Derive the expression for capacitance of a Single phase transmission line. **(07 Marks)**

b. Write a short notes on Bundled conductors. **(05 Marks)**

c. A 3 – phase, 50 Hz, 132 KV, overhead line has conductors placed in a horizontal plane 4m apart. Conductor diameter is 2cm. If the length is 100 km, calculate the charging current per phase assuming complete transposition. **(08 Marks)**

7 a. Deduce an expression for transmission efficiency and regulation for medium transmission line using nominal 'T' method. **(06 Marks)**

b. A 3- phase, 50 Hz, 150 km line has a resistance , inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5 Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW and 110 KV and 0.8 p.f lagging, determine the sending end voltage and current. Assume a nominal 'π' circuit for the line. **(10 Marks)**

c. Write short note on 'Ferranti effect'. **(04 Marks)**

8 a. Bring out the difference between :

i) Feeders , distributions and service mains.

ii) Radial system and ring main systems. **(06 Marks)**

b. Explain the various types D.C. distributions. **(07 Marks)**

c. What are the methods used to solving A.C. distribution problems? Explain any one method in detail. **(07 Marks)**

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10EE54

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
D.C Machines and Synchronous Machines

Time: 3 hrs. Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting at least TWO questions from each part.*
2. *Assumed missing data if any*

PART – A

1 a. Explain the various causes for the failure of D.C shunt generator to build up voltage. **(04 Marks)**

b. Derive the expression for demagnetizing Amps turns per pole and cross magnetizing Amp turns per pole. **(08 Marks)**

c. A 4 pole wave connected DC shunt generator runs at 1000 rpm when supplying 330 lamps each rated at 60W, 110V. If has a shunt field current of 2A. There are 90 commutator segments and brush width is equal to 1.1 commutator segments. The self inductance of each coil is 0.025mH. Determine the reactance voltage for a linear commutation. **(08 Marks)**

2 a. Explain the characteristics of D.C shunt and D.C series motor give two applications of each motor. **(06 Marks)**

b. Which are the types of speed control? Explain the speed control of D.C shunt motor. **(06 Marks)**

c. A six six, pole lap wound 400V series motor has the following data :

Number of armature conductors	=	920
Flux/pole	=	0.045wb
Total motor resistance	=	0.6 ohm
Iron and friction losses	=	2kW

If the current taken by the motor is 90A. Find
(i) Total torque
(ii) Use full torque at the shaft
(iii) Power output. **(08 Marks)**

3 a. List the various types of losses in a D.C machine. **(04 Marks)**

b. Explain the necessity of a starter in a D.C motor with neat diagram, explain the three point starter. **(08 Marks)**

c. A 250V shunt motor has an armature current of 20A when running at 1000rpm against full load torque. The armature resistance is 0.5Ω. What resistance must be inserted in series with the armature to reduce the speed to 500rpm at the same torque? What will be the speed if the load torque is halved with this resistance? **(08 Marks)**

4 a. With neat circuit diagram, explain the method of testing a DC motor by retardation test. **(10 Marks)**

b. A 440V DC shunt motor takes 4A at no load. Its armature and field resistances are 0.4ohm and 220ohm respectively. Estimate the kW output and efficiency when the motor takes 60A on full load. Find also the percentage change in speed from no load to full load. **(10 Marks)**

PART – B

5 a. Mention the advantages of rotating field and stationary armature, in a three phase alternator. **(06 Marks)**

b. What are Harmonics? How are they minimized in three phase alternator? **(04 Marks)**

c. A 3 phase, 16 pole alternator has the following data :
Number of slots = 192, Conductor/slot = 8, Coil span = 160 electrical degree, speed of the alternator 375rpm, flux/pole = 55mWb. Calculate the phase and line voltages. **(10 Marks)**

6 a. Explain voltage regulation in a 3 phase Alternator with neat circuit diagram; explain how voltage regulation can be calculated by EMF method. **(10 Marks)**

b. A 3300V, 3 phase star connected alternator has a full load current of 100A. On short circuit a field current of 5Amp was necessary to produce full load current. The e.m.f on open circuit for the same excitation was 900 volts. The armature resistance was 0.8Ω/phase. Determine the full load voltage regulation for (i) 0.8p.f lagging (ii) 0.8p.f leading. **(10 Marks)**

7 a. List the conditions to be fulfilled to connect two alternators in parallel. **(02 Marks)**

b. Define X_d and X_q. Describe how slip test can be conducted in the laboratory, for measuring X_d and X_q. **(08 Marks)**

c. Two 1 phase alternator operate in parallel and supply a load impedance of (3 + j4) Ω. If the impedance of each machine is (0.2 + j2) and emf's are (200 +j0) and (220 + j0) volts respectively. Determine for each machine
(i) Terminal voltage
(ii) Power factor
(iii) Output. **(10 Marks)**

8 a. Write short notes on :
i) Starting of synchronous motors
ii) Synchronous motor as synchronous condenser **(10 Marks)**

b. A 6600V, 3 phase star connected synchronous motor draws a full loads current of 80A at 0.8pf leading. The armature resistance is 2.2Ω and reactance 22Ω per phase. If the stray losses of the machine are 3200W. Find
i) E.M.F induced
ii) Output power
iii) Efficiency of the machine. **(10 Marks)**

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10EE55

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Modern Control Theory

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, selecting at least TWO full questions from each part.***

PART – A

1 a. Define the concept of i) State ii) State variables iii) State space. **(06 Marks)**

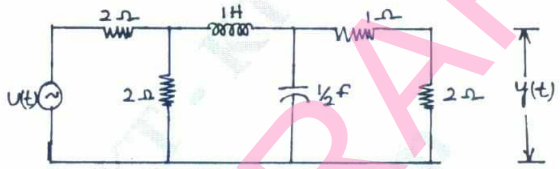
b. Consider the multivariable system described by the differential equations, obtain the state model of the system.

$$\frac{d^2y_1(t)}{dt^2} + 4\frac{dy_1(t)}{dt} - 3y_2(t) = u_1(t) \rightarrow (1)$$

$$\frac{dy_1(t)}{dt} + \frac{dy_2(t)}{dt} + y_1(t) + 2y_2(t) = u_2(t) \rightarrow (2).$$ **(06 Marks)**

c. Represent the electrical network given in Fig.Q.1(c) by a state equation and output equation. **(08 Marks)**

Fig.Q.1(c)

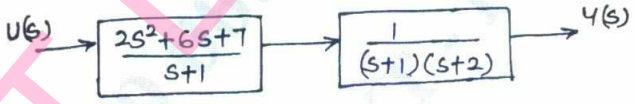


2 a. Obtain the two state variable forms and hence draw the state diagram for both forms i.e., i) Phase variable form ii) Canonical variable form, for the following transfer function,

$$\frac{Y(s)}{U(s)} = \frac{6}{s^3 + 6s^2 + 11s + 6}.$$ **(12 Marks)**

b. Write down the canonical model for the given complete system shown in Fig.Q.2(b). **(08 Marks)**

Fig.Q.2(b)



3 a. For the given state model obtain the transfer function,

$$\begin{bmatrix} x_1' \\ x_2' \\ x_3' \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & -1 & 1 \\ 0 & -1 & -10 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 0 \\ 0 \\ 10 \end{bmatrix} u$$

$$y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$ **(08 Marks)**

b. Narrate the importance of diagonalization. **(02 Marks)**

c. Consider a matrix A given below,

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$$

Obtain the diagolized matrix A. **(10 Marks)**

4 a. Define state transition matrix and mention any two properties. **(04 Marks)**

b. Consider a control system with state model

$$\begin{bmatrix} x_1' \\ x_2' \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 2 \end{bmatrix} u; \begin{bmatrix} x_1(0) \\ x_2(0) \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$$

Compute the state transition matrix and there from find the unit step response, for the given initial condition. **(08 Marks)**

c. Consider the system with state equation,

$$\begin{bmatrix} x_1' \\ x_2' \\ x_3' \end{bmatrix} = \begin{bmatrix} 0 & 0 & 0 \\ 1 & 0 & -3 \\ 0 & 1 & -4 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} + \begin{bmatrix} 40 \\ 10 \\ 0 \end{bmatrix} u(t)$$

$$y = \begin{bmatrix} 0 & 0 & 1 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$$

Evaluate controllability and observability using either Kalman's test or Gilbert's test. **(08 Marks)**

PART – B

5 a. Prove that a necessary and sufficient condition for arbitrary pole placement in that system is completely state controllable. **(10 Marks)**

b. Consider the system represented by,

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -6 & -11 & -6 \end{bmatrix}; \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} \text{ and } C = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix}.$$ Design a full order observer such that the observer eigen values are at $-2 \pm j2\sqrt{3}$ and -5. **(10 Marks)**

6 a. Write a short note on: i) Saturation ii) Dead zone iii) friction. **(06 Marks)**

b. Consider the system designed by,

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}; \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}.$$

Using state feedback control u = -KX, it is desired to have the closed loop poles at S = -1 ± j2, S = -10. Determine the state feed back gain matrix K. **(08 Marks)**

c. Define controller. Explain P and PI controller with the help of block diagram. What are the advantages of PID controller? **(06 Marks)**

7 a. With reference to non-linear system explain i) Jump resonance ii) Limit cycles. **(06 Marks)**

b. What are singular points? Find out singular points for the following systems.

i) $y'' + 3y' - 10 = 0$ ii) $y'' + 3y' + 2y = 0$

Also show the trajectories for the singular points. **(14 Marks)**

8 a. Explain with an example: i) Liapunov main stability theorem ii) Liapunov second method iii) Krasovskii's theorem. **(10 Marks)**

b. Using Lyapunov's direct method, find the range of K to guarantee stability of the system shown in Fig.Q.8(b). **(10 Marks)**

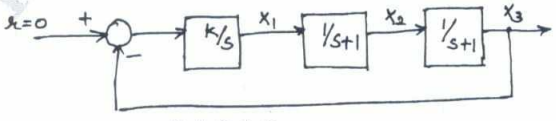


Fig.Q.8(b)

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10EE56

Fifth Semester B.E. Degree Examination, Dec.2018/Jan.2019
Linear IC's and Application

Time: 3 hrs. Max. Marks:100

Note: *1. Answer FIVE full questions, selecting atleast TWO questions from each part.*
2. Use of standard resistance/capacitance chart permitted.

PART – A

1 a. Sketch the circuit of high input impedance capacitor coupled voltage follower. Develop the equation for input impedance list design steps. **(08 Marks)**

b. A capacitor coupled non-inverting amplifier is to be designed with $A_v = 120$ and $V_L = 4.2V$. Load resistance is 8.2KΩ and lower cut off frequency is 60Hz. Design the circuit using 715 op-amp [Assume $I_{B(max)} = 1.5\mu A$] **(07 Marks)**

c. What is setting upper cut-off frequency? Why is it necessary explain how it can be achieved for an inverting amplifier. **(05 Marks)**

2 a. Explain : i) phase lag ii) phase lead compensation methods for op-amp circuits with lower closed loop gains. **(08 Marks)**

b. Explain effect of slew rate on :
i) Band-width and output amplitude
ii) Output pulse rise time and amplitude. **(08 Marks)**

c. A 741 op-amp is used as an inverting amplifier with a gain of 50. The voltage gain versus frequency plot is flat upto 20KHz. What is peak to peak sine wave input that can be amplified without any distortion. Assume SR = 0.5V/μsec. **(04 Marks)**

3 a. Draw on high input impedance full-wave precision rectifier. Show various waveforms. Write down appropriate equations to show that full wave rectification is achieved. **(09 Marks)**

b. Explain with a neat circuit working of a precision clamping circuit. Show how output can be biased at any desired level. **(06 Marks)**

c. With a neat circuit, explain working of a sample and hold circuit. **(05 Marks)**

4 a. With a neat circuit, explain working of an inverting Schmitt trigger. Draw waveforms and transfer char. Give equations for designing. **(07 Marks)**

b. An inverting Schmitt trigger with UTP = 0 and $V_H = 0.2V$ converts a 1KHz sine wave of amplitude 4V peak to peak to a rectangular wave. Determine T_{ON} and T_{off}. **(06 Marks)**

c. Draw a monostable multivibrator circuit and draw various waveforms at different points of the circuit write an expression for pulse width of the output. **(07 Marks)**

PART – B

5 a. Compare an RC phase shift oscillator with Wien bridge oscillator. **(06 Marks)**

b. Draw a triangular/rectangular wave generator circuit. Explain how frequency and duty cycle control is achieved. **(09 Marks)**

c. Design a RC phase shift oscillator, to give a maximum output of ±3V at a frequency of 6KHz. Include distortion minimization adjustment. **(05 Marks)**

6 a. Compare a wide band filter with a narrow band filter. **(06 Marks)**

b. Explain a second order high pass filter. List out design steps show the frequency response. **(08 Marks)**

c. Using 741 op-amp design a bandpass filter with centre frequency at 1KHz and passband to be approximately ±33Hz on each of 1KHz. **(06 Marks)**

7 a. What is a power amplifier? List features of LM380 audio amplifier. **(06 Marks)**

b. List advantages of switched capacitor filter and explain how a switched capacitor can simulate a resistor. **(07 Marks)**

c. Explain phase locked loop with block diagram. define the terms :
i) lock range ii) capture range. **(07 Marks)**

8 a. Define terms :
i) Line regulation
ii) Load regulation
iii) Ripple rejection, applied to voltage regulation. **(06 Marks)**

b. With a neat circuit explain operation of adjustable output regulator. **(06 Marks)**

c. A positive voltage regulator is to produce an output voltage of 2V. Design the circuit using LM217 IC voltage regulator. **(08 Marks)**

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