

Hall Ticket Number : 

--	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7G234**

II B.Tech. I Semester Supplementary Examinations November 2020

**Electrical Circuit and Technology**

( Electronics and Communication Engineering )

Max. Marks: 70

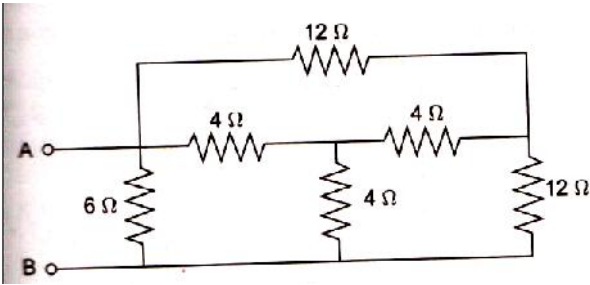
Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

**UNIT-I**

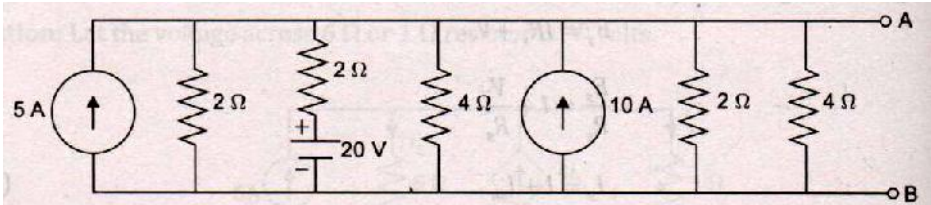
- 1. a) Write briefly about delta to star conversion. 6M
- b) Find the equivalent resistance between the terminals A and B in the figure shown below:



8M

**OR**

- 2. a) What is source transformation? Explain briefly. 6M
- b) By using source transformation technique, convert the circuit shown below into a single voltage source and single resistance.



8M

**UNIT-II**

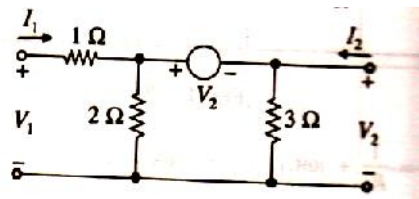
- 3. a) Obtain RMS value, average value, form factor and peak factor of full wave rectified sine wave. 10M
- b) Find the RMS value of the resultant current in a conductor which carries simultaneously sinusoidal alternating current with a maximum value of 15 A and direct current of 15 A. 4M

**OR**

- 4. a) Derive the relationship between band width and half power frequencies of RLC series circuit. 6M
- b) A series RLC circuit with R=25 and L=0.6 H results in a leading phase angle of 60° at a frequency of 40 HZ. At what frequency will the circuit be resonant? 8M

**UNIT-III**

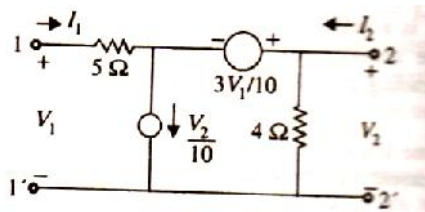
5. For the network shown below, find the y parameters. Explain whether the network is reciprocal and symmetrical.



14M

**OR**

6. Find the ABCD parameters of the two port network of figure shown below:



14M

**UNIT-IV**

7. a) Derive the emf equation of dc generator. 7M  
 b) Explain the procedure for obtaining the magnetization characteristics of dc generator. 7M

**OR**

8. a) Mention the applications of dc shunt and series motors. 7M  
 b) Explain Swinburne's test. 7M

**UNIT-V**

9. a) Explain the principle of operation of single phase transformer. 8M  
 b) Define the terms efficiency and regulation. Write their expressions for a single phase transformer. 6M

**OR**

10. a) Explain briefly the principle of operation of induction motor. 6M  
 b) Explain brake test on three phase induction motor. 8M

\*\*\*\*

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G331

II B.Tech. I Semester Supplementary Examinations November 2020

### Electronic Circuits

( Electronics and Communication Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

#### UNIT-I

1. Derive voltage gain, current gain, input impedance and output impedance of a CE transistor amplifier circuits in terms of h-parameter.  $h_{12}$  and  $h_{21}$  are small signal low frequency equivalent hybrid parameters of a transistor. Interpret them.

OR

2. Sketch a R-C coupled, transistorized, CE amplifier using NPN transistor. Draw its frequency response. Why the gain is low at very low and high frequencies? How the bandwidth of amplifier is determined from this response?

#### UNIT-II

3. (i) Show that rise time of a single stage amplifier is proportional to its upper 3dB cutoff frequency. (ii) Find out the impulse response of a single stage low pass filter.

OR

4. Prove that the higher 3dB cutoff frequency is given by:

$$W_H = \frac{1}{(C_C + C_L)R_L}$$

Adding a pre-amplifier to an audio amplifier increases the voltage gain by 60dB. What is the corresponding factor by which the voltage is increased?

#### UNIT-III

5. Find the input resistance, output resistance of an amplifier that employs voltage series feedback.

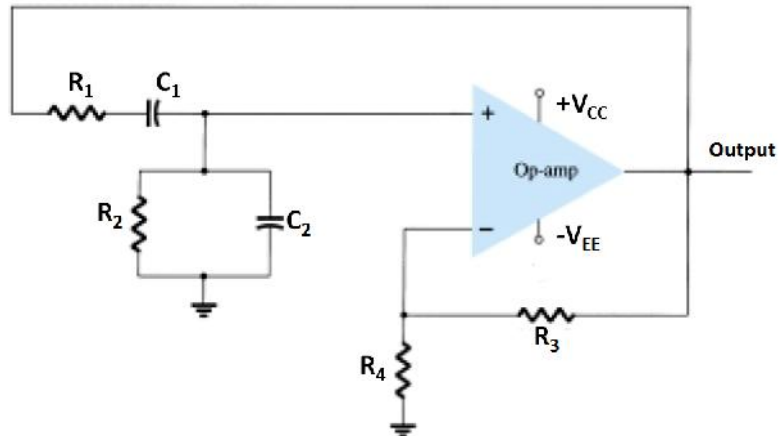
Consider a general feedback system with parameters  $A=10^6$  and  $A_f=100$ . If the magnitude of A decreases by 20percentage what is the corresponding percentage in  $A_f$ .

OR

6. Derive suitable expression for the input resistance and the voltage gain of a trans-conductance amplifier that uses negative feedback. The open loop gain of an amplifier changes by 5 percentages. If 10dB negative feedback is applied, calculate percentage change of the closed loop gain.

UNIT-IV
---------

7. Why wein bridge oscillators are most popular in audio frequency range? Derive the oscillation frequency of a Wien bridge oscillator and show that  $R_3=2R_4$ .



OR

8. Draw the electrical equivalent circuit of a crystal. Why an oscillator circuits using crystal gives stable frequency? Derive the series resonance frequency and Parallel resonance frequency of a crystal oscillator.

UNIT-V
--------

9. With a neat diagram derive the efficiency of a transformer coupled Class-A power amplifier when a square wave signal of peak amplitude  $V_m$  is given as the input. Why low beta ( ) is generally preferred in power amplifiers?
- OR
10. With a neat diagram derive the efficiency of a transformer coupled Class-B power amplifier when a sinusoidal wave signal of peak amplitude  $V_m$  is given as the input. Explain the principle operation of a push pull power amplifier. Compare its performance with complementary symmetry power amplifier

\*\*\*

Code: 7GC32

II B.Tech. I Semester Supplementary Examinations November 2020

**Engineering Mathematics – III**

( Common to All Branches )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

**UNIT-I**

1. a) Find a root of the equation  $x^3 - x - 11 = 0$  by using Bisection method.  
 b) Find a root of the equation  $3x = \cos x + 1$  by Newton-Raphson method, correct to three decimal places.

**OR**

2. a) Apply Euler's method to solve for y when  $x = 0.6$  given that  $y' = 1 - 2xy$ ,  $y(0) = 0$ .  
 b) Using Runge-Kutta method of order 4, compute  $y(0.2)$  from

$$10 \frac{dy}{dx} = x^2 + y^2, y(0) = 1, h = 0.1.$$

**UNIT-II**

3. a) Find the missing term in the following table using Lagrange's interpolation

x	1	2	4	5	6
y	14	15	5	-	9

- b) From the following table, estimate the number of students who obtained marks between 40 and 45.

Marks	30-40	40-50	50-60	60-70	70-80
Number of Students	31	42	51	35	31

**OR**

4. a) Evaluate  $\int_0^1 \frac{1}{1+x^2} dx$ , by using Trapezoidal rule with  $h = 0.2$ . Hence determine the value of  $f$ .

- b) Compute the value of  $\int_{0.2}^{1.4} (\sin x - \log x + e^x) dx$  using Simpson's  $\frac{3}{8}$ <sup>th</sup> rule.

**UNIT-III**

5. a) Find the least squares fit of the form  $y = a_0 + a_1x^2$  to the following data

x	-1	0	1	2
y	2	5	3	0

- b) Solve :  $xp - yq = y^2 - x^2$ .

**OR**

6. a) Fit a curve of the form  $y = ae^{bx}$  to the following data.

x	0	1	2	3
y	1.05	2.10	3.85	8.30

- b) Using method of separation of variables, Solve  $\frac{\partial u}{\partial x} = 4 \frac{\partial u}{\partial y}$ , given that  $u(0, y) = 8e^{-3y}$ .

## UNIT-IV

7. a) If  $f(x) = \begin{cases} -x, & -f < x < 0 \\ x, & 0 < x < f. \end{cases}$

then show that  $f(x) = \frac{f}{2} - \frac{4}{f} \left[ \frac{1}{1^2} \cos x + \frac{1}{3^2} \cos 3x + \frac{1}{5^2} \cos 5x + \dots \right]$ .

b) Find a Fourier series to represent  $f(x) = |\sin x|$  in the interval  $-f < x < f$ .

OR

8. a) Obtain the half range sine series for  $e^x$  in  $0 < x < 1$ .

b) Find the Half range cosine series for the function  $f(x) = (x-1)^2$  in the interval  $0 < x < 1$ .

## UNIT-V

9. a) Find the Fourier transform of  $f(x) = \begin{cases} 1 & \text{for } |x| < 1 \\ 0 & \text{for } |x| > 1. \end{cases}$  Hence evaluate  $\int_0^{\infty} \frac{\sin x}{x} dx$ .

b) Find the Fourier Cosine transform of  $f(x) = \begin{cases} x, & 0 < x < 1 \\ 2-x, & 1 < x < 2 \\ 0, & x > 2 \end{cases}$ .

OR

10. a) Find the Fourier sine transform of  $\frac{e^{-ax}}{x}$ .

b) Show that the inverse finite Fourier sine transform of  $F_s(n) = \frac{1}{f} \left\{ 1 + \cos nf - 2 \cos \frac{nf}{2} \right\}$  is

$$f(x) = \begin{cases} 1, & 0 < x < f/2 \\ -1, & f/2 < x < f \end{cases}$$

\*\*\*\*

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7GC31**

II B.Tech. I Semester Supplementary Examinations November 2020

**Environmental Science**

( Electronics and Communication Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

**UNIT-I**

1. a) Define Environment. With the help of diagram relate the interactions between different components of environment. 7M
- b) Enumerate multidisciplinary nature of environmental studies. 7M

**OR**

2. a) Explain different methods to create environmental awareness in public. 7M
- b) Describe the importance of environmental studies. 7M

**UNIT-II**

3. a) List the uses of forest resources and Mention main causes for deforestation. 7M
- b) With the help of neat sketch explain water cycle in environment. 7M

**OR**

4. a) Summarise the impacts of construction of Dams on forest and tribal people. 7M
- b) List and explain the environmental effects of extracting mineral resources and soil erosion. 7M

**UNIT-III**

5. a) With the help of neat diagram explain energy flow and material flow in the environment. 7M
- b) Draw neat diagram of Nitrogen cycle and explain the flow of different forms of nitrogen in environment. 7M

**OR**

6. a) Identify major threats to biodiversity and explain In- Situ conservation techniques 7M
- b) Compare different biodiversity hot spots. 7M

**UNIT-IV**

7. a) Define Noise. List the causes, effects and control methods of Noise pollution. 7M
- b) Explain the phenomena and effects of thermal pollution with an example. 7M

**OR**

8. a) Briefly outline the sources of water pollution and suggest water pollution control methods. 7M
- b) With a case study discuss the effects of nuclear hazard. 7M

**UNIT-V**

9. a) With neat sketch explain different rain water harvesting techniques. 7M
- b) Enumerate causes, effects and control measures of acid rain. 7M

**OR**

10. a) Write a note on Forest conservation act. 7M
- b) Discuss the effect of population explosion on environment. 7M

\*\*\*\*

Hall Ticket Number :																			
----------------------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

**R-17**

**Code: 7G333**

II B.Tech. I Semester Supplementary Examinations November 2020

**Signals and Systems**

( Electronics and Communication Engineering )

Max. Marks: 70

Time: 3 Hours

Answer all five units by choosing one question from each unit ( 5 x 14 = 70 Marks )

\*\*\*\*\*

**UNIT-I**

- 1. a) Explain the various operations on signals 7M
- b) Determine whether the following signals are periodic or not? If periodic determine fundamental period.
- i)  $\cos t + \sin \sqrt{2}t$  Cost   ii)  $2 \cos 100ft + 5 \sin 50t$  7M

**OR**

- 2. State and prove the properties of Fourier series 14M

**UNIT-II**

- 3. Define Fourier transform. Explain the properties of Fourier transform 14M

**OR**

- 4. a) Obtain the Fourier transform of a periodic train of impulses with period T. 7M
- b) Obtain the Fourier transform of the following functions.
- i) Unit step function   ii) Unit impulse function 7M

**UNIT-III**

- 5. a) What is the impulse response of two LTI systems connected in parallel? 7M
- b) Differentiate LTI system with LTV system. 7M

**OR**

- 6. a) Explain the difference between the following systems.
- i) Linear and non-linear systems.   ii) Time variant and time invariant systems 7M
- b) Discuss about the Causality and physical reliability of a system. 7M

**UNIT-IV**

- 7. a) Explain the relation between convolution and correlation. 7M
- b) State and prove Time convolution property 7M

**OR**

- 8. Find the graphical convolution between following signals 14M
- $x(t)=1$  for  $0 \leq t \leq 2$  and  $h(t)=1$  for  $0 \leq t \leq 3$
- $0$  otherwise  $0$  otherwise

**UNIT-V**

- 9. a) Discuss any 3 properties of Laplace transform. 7M
- b) Find the inverse Laplace transform of  $x(s) = 5(s+5)/ s(s+3) (s+7)$ ;  $\text{Re}(s) > -3$  7M

**OR**

- 10. a) For the transfer function  $H(s) = s+10/ s^2 +3s+2$  find the response due to input  $x(t)=\sin 2t u(t)$  7M
- b) Explain the Initial and Final value theorems of Laplace transform 7M

\*\*\*