



Regulation R20

Subject code: 3P3BC

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

## B.Tech III Semester Supplementary Examinations, July 2022

### ANALOG ELECTRONICS (Electrical and Electronics Engineering)

Maximum Marks: 70

Date: 23.07.2022 Duration: 3 Hours

- Note:
1. This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 10 questions. Answer any 5 questions which carries 10M.
  4. Each question carries 12 marks and may have a, b, c, d as sub questions.

#### Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 What are the different configurations of BJT?
- 2 Give some characteristics of CE amplifier?
- 3 Define harmonic distortion.
- 4 What are the types of feedback?
- 5 What is heat sink?
- 6 Mention the achievable Maximum Efficiency of Class - A Amplifier.
- 7 Define step wave form mathematically.
- 8 What are the applications of clamping circuit?
- 9 Define storage time of a transistor.
- 10 What is a multivibrator? List different types of multivibrators.

#### Part-B

ANSWER ALL THE QUESTIONS

(10M x 5=50Marks)

- 11 Derive the equations for voltage gain, current gain, input impedance and output admittance for a BJT using low frequency h-parameter model for CB configuration. 10M
- OR
- 12 Draw the equivalent circuit and derive the expression for CE amplifier. 10M
  - 13 What is the effect of a voltage series negative feedback in the following performance measures of a BJT amplifier: 10M
    - (i) Input resistance
    - (ii) Output resistance
    - (iii) Bandwidth
    - (iv) Distortion and noise
    - (v) Gain stability

OR

- 14 a) Describe the construction of Hartley oscillator and explain its working. 7M  
b) In an RC phase shift oscillator, if its frequency of oscillation is 955 Hz and  $R_1=R_2=R_3=680\text{ K}\Omega$ . Find the value of capacitors. 3M

- 15 Derive the equation for efficiency of a class B Push pull amplifier. 10M  
OR
- 16 a) Evaluate the expression for maximum conversion efficiency for a simple series fed Class A power amplifier. What are the drawbacks of transformer coupled power amplifiers? 7M  
b) Compare the push-pull class B and complementary symmetry class B amplifier. 3M
- 17 a) Explain the operation of a negative peak clamper circuit with its diagram. 5M  
b) Explain about parallel diode clippers with example 5M  
OR
- 18 Sketch the response of RC High pass circuit for pulse input and derive the output equations for the above inputs. 10M
- 19 a) Explain switching times in a transistor. 6M  
b) Design a high-speed common emitter transistor switch operating with 2 power supplies  $V_{CC} = 12\text{ V}$  and  $-V_{BB} = -10\text{ V}$ . The transistor is expected to operate at  $I_C = 8\text{ mA}$ ,  $I_B = 0.75\text{ mA}$ . The static current gain  $h_{fe}$  of the transistor is 30,  $V_{BE(\text{sat})} = 0.9\text{ V}$ ,  $V_{CE(\text{sat})} = 0.3\text{ V}$  and  $R_2 = 3R_1$ . Determine the values of three resistors  $R_C$ ,  $R_1$  and  $R_2$ . 4M  
OR
- 20 With a neat sketch, explain the operation of a bistable multivibrator. 10M