FIJI NATIONAL UNIVERSITY

COLLEGE OF ENGINEERING, SCIENCE AND TECHNOLOGY

SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

TRADE DIPLOMA IN ELECTRONICS ENGINEERING PROGRAMME, (TDEEN 4)

EEE 552 ANALOG ELECTRONICS II

FINAL EXAMINATION
(TRIMESTER 1, 2018)

DATE/TIME/ROOM – Refer to Timetable

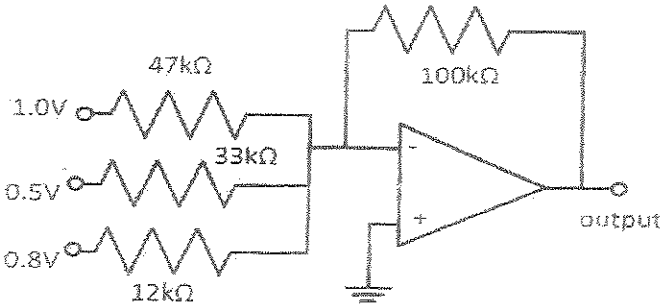
Total Marks – 100 Time Duration – 3 hours & 10 Minutes

INSTRUCTIONS TO CANDIDATES

1. You are allowed 10 minutes extra time during which you are not to write.
2. Begin each answer on a fresh new page and use both sides of the sheets.
3. Write your identification number on the top of each attached sheet.
4. Insert all written foolscaps, graph paper, drawing paper etc. in their correct sequence and secure with string provided.
5. For all sheets of paper in which has been done, cross it through and you must attach to your answer script.
6. Write clearly the number(s) of the question(s) attempted on the top of each sheet.
7. ANSWER ALL QUESTIONS.

1. Explain the working and applications of ANY ONE analog to digital converters
   (i) Flash type or Simultaneous type
   (ii) Counter type
   [10 Marks]

2. (a) Draw the block diagram of negative feedback arrangements. Derive an expression for gain with negative feedback. [5 Marks]
   (b) Determine the output voltage for circuit given below [5 Marks]



3. (a)Write short notes on ANY ONE [7 Marks]
   (i) Single stage transistor amplifiers
   (ii) Heat Sink
   (b) A multistage amplifier consists of three stages, the voltage gain of stages are 60, 100 and 160. Calculate the overall gain in *db*. [3 Marks]

4. (a) What do you understand by harmonic distortions and Total Harmonic Distortions in amplifier circuits? [6 Marks]
   (b) Calculate the harmonic distortion components for an output signal having fundamental amplitude of 2.1 V, second harmonic amplitude of 0.3 V, third harmonic component of 0.1 V, and fourth harmonic component of 0.05 V. Also calculate the total harmonic distortion for the amplitude components. [4 Marks]

5. (a) Draw the circuit diagram of RC phase shift oscillators using BJT/OP-AMP and explain its operation. Write the expression of frequency and the conditions for sustained oscillations. [6 Marks]
   (b) A Wien Bridge Oscillator circuit is required to generate a sinusoidal waveform of 5,200 Hertz (5.2 kHz). Calculate the values of the frequency determining resistors R_1 and R_2, assume the value for the feedback capacitors is 3.0nF to produce the required frequency. Also, if the oscillator circuit is based around a non-inverting operational amplifier configuration, determine the minimum values for the gain resistors to produce the required oscillations. Finally draw the resulting oscillator circuit. [4 Marks]

6. (a) With the help of neat diagram discuss the pin configuration with internal structure of 555 timer ICs. [5 Marks]
   (b) Explain the working of 555 timers as an oscillator circuit in Monostable mode. Also show the waveforms for the capacitor and output voltage with respect to trigger input. [5 Marks]

7. (a) Write about major categories of the applications of Light Emitting Diodes (LEDs) and also write at least two applications. [5 Marks]
(b) Mention about the basic design components of Photocouplers/optocoupler and Optoisolators. Also write the difference between the optocoupler and optoisolator. [5 Marks]

8. (a) Explain the construction, working principle and (at least two) applications of ANY ONE of the following [8 Marks]
(i) Photodiodes
(ii) Phototransistor
(b) Briefly explain power amplifiers and its basic principle of operation. [2 Marks]

9. Explain the working of Cathode Ray Tube? Also explain CRT with its diagram & its components? Also write at least two advantages of CRT. [10 Marks]

10. (a) With the help of suitable circuit diagram, explain the construction and working of Silicon Controlled Rectifier (SCR) and draw the V-I characteristics in forward and reverse biased mode. [6 Marks]
(b)With reference to SCR, define the following terms
(i) Break over voltage [1 Mark]
(ii) Holding current [1 Mark]
(iii) Forward current rating [1 Mark]
(iv) Peak reverse voltage [1 Mark]

[THE END]