B. Sc. in EEE, 3rd Semester — October 11, 2023 (**Afternoon**)

ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

Mid-Semester Examination — Winter Semester, A.Y. 2022-2023
Course No.: EEE 4303 — Time: 90 Minutes
Course Title: Electronics II — Full Marks: 75

There are 3 **(three)** questions. Answer all 3 **(three)** questions. The symbols have their usual meanings. Programmable calculators are not allowed. Marks of each question and corresponding COs and POs are written in the brackets.

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1. a) Formulate the expression of output voltage for a non-inverting summing amplifier in case of three input voltages. **(12.5) (CO1) (PO1)**

b) Determine the equation of the closed-loop voltage gain, A_v of the T-feedback inverting amplifier shown in Fig. 1(b). **(12.5) (CO2) (PO2)**

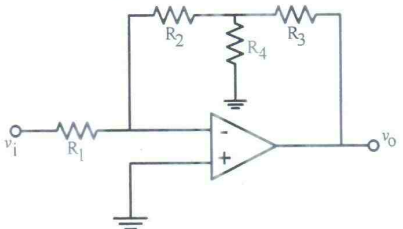

Fig. 1(b)

2. a) Sketch the Bode plots (magnitude & phase) for the transfer function, $H(\omega) = \frac{5(j\omega+2)}{j\omega(j\omega+10)}$. **(12.5) (CO1) (PO1)**

b) Explain the Bode plot in Fig. 2(b) and find the transfer function $H(\omega)$. **(12.5) (CO2) (PO2)**

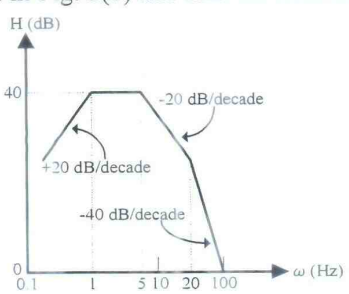

Fig. 2(b)

3. a) sketch the circuit diagram of a unity gain amplifier and a precision half-wave rectifier circuit with its voltage transfer characteristics using op-amp. **(12.5) (CO1) (PO1)**

b) Design a two-pole high-pass Butterworth active filter with a cutoff frequency at f_{3dB} = 25 kHz and a unity gain magnitude at high frequency. Also determine the magnitude (in dB) of the gain at f = 25 kHz. **(12.5) (CO2) (PO2)**