Birla Institute of Technology & Science, Pilani
Work Integrated Learning Programmes Division
Second Semester 2024-2025

Comprehensive Exam
(EC-3 Regular)

Course No.   : SE ZG530
Course Title   : Design of Conversational Experiences
Nature of Exam   : Open Book
Weightage   : 35%
Duration   : 2.5 Hours
Date of Exam   : 24/05/2025 (AN)

| No. of Pages   = 2 |
| No. of Questions = 6 |

Note to Students:
1. Please follow all the *Instructions to Candidates* given on the cover page of the answer book.
2. All parts of a question should be answered consecutively. Each answer should start from a fresh page.
3. Assumptions made if any, should be stated clearly at the beginning of your answer.

Q.NO	Question
1	During a conversation with a health bot, a user makes an utterance as follows: **User:** "I've been coughing a lot lately, and my throat feels dry. It's not painful, but I'm a bit worried." **a.** Identify the **disambiguation** and **negation** portions in this statement. **(2 marks)** **b.** Propose how the bot can handle the **disambiguation** part of the utterance. **(1 mark)** **c.** Decide whether a **constrained** or **open speech** response is better for this scenario. Justify your answer. **(1 mark)**
2	You are working with a Large/Small Language Model (LLM/SLM) for two different use cases: 1. **Use Case A:** Writing fictional short stories for a creative writing platform, with varying genres and character styles. 2. **Use Case B:** Summarizing legal documents where factual accuracy, clarity, and completeness are crucial. a)For **Use Case A**, how would you configure the **temperature** and **top_p** hyperparameters? Justify your configuration. **(2 marks)** b)For **Use Case B**, how would you configure the **temperature** and **stream** hyperparameters? Justify your choices based on the task's nature. **(2 marks)**
3	*Imagine a user, Raj, who interacts with a virtual health assistant via a mobile app to manage his wellness and appointments. Raj uses this assistant to ask questions like: "What's my upcoming appointment?", "Book a dentist appointment for next Friday," or "Cancel my physiotherapy session scheduled for tomorrow." He also uses it to track health symptoms, saying things like "Log sore throat and fever today," or "I've had a headache for the past three days." When requesting information, he might say, "How many steps did I walk yesterday?" or "Show my sleep record for this week." In some cases, Raj expresses discomfort or concern, saying, "I'm feeling anxious lately" or "I'm not sleeping well these days." The bot*

	is expected to understand intents, extract date/time and symptom entities, provide empathetic responses, and help Raj manage his health data and appointments. **a.** Identify at least **four distinct intents** that the virtual assistant should support based on the scenario. **(4 marks)** **b.** Identify **system and custom-defined entities** that should be extracted from Raj's utterances. **(4 marks)** **c.** Provide **two sample utterances** that correspond to different intents from the scenario. **(2 marks)** **d.** Write a Python function that uses a language model to analyze the **sentiment** of Raj's statement: *"I'm feeling anxious lately and not sleeping well."* Assume use of OpenAI's GPT model and provide the relevant code. **(5 marks)**
4	Review each of the following statements related to chatbot design. Indicate whether you **agree or disagree** with each one. Then, provide a **concise justification** (2–4 lines) based on principles of effective conversational AI design. **[4 marks]** **a.** In e-commerce chatbot flows, offering multiple product suggestions immediately after a user's failed search attempt increases clarity and improves user satisfaction. **b.** For a chatbot handling returns and refunds, the first step should always be to directly connect the user with a human support agent.
5	A university has introduced a virtual tutor named "Ava" — a voice-enabled digital avatar that helps students with programming assignments. Ava speaks in a friendly tone, shows visual expressions on a screen, and even wears a hoodie with the university logo. Ava responds to student queries like, "What is a while loop?" and gives both verbal and visual feedback. **Analyze the scenario and explain how Ava supports the following avatar design roles:** (a) Humanizing Interaction **[1 Mark]** (b) Visual Cues **[1 Mark]** (c) Enhanced Engagement **[1 Mark]** (d) Brand Identity **[1 Mark]** Note:Answers must connect each design role with a specific aspect of the scenario
6	A user interacts with a smart home assistant powered by an AI platform (like Alexa or Google Assistant) to fix a smart light that won't connect to the network. The user says: *"My living room light won't connect to the Wi-Fi."* Explain how the assistant would use **confidence score detection** to process the user's intent, and how it would apply the **two-strikes rule** if it fails to understand the input twice. Make reasonable assumptions about the assistant's threshold behavior and response design. **[4 Marks]**

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