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| **Question Paper Title: ISA-II** | | | | | | | | |
| **Total Duration (H:M): 1:15** | | **Course :Automotive Electronics** | **Course Code: 22EECC305** | | | | | |
| **Date: 24/04/2023** | | |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | **USN** |  |  |  |  |  |  |  |  |  |  |  |  | | **Maximum Marks: 40** | | | | | |
| **Note: Answer any two full questions.** | | | | | | | | |
| **Q.No.** | **Questions** | | | **Marks** | **CO** | **BL** | **PO** | **PI** |
| 1a | Discuss the physical mechanism of wheel lock and vehicle skid that can occur during braking; How the ABS configuration provides a solution for this.  If the vehicle longitudinal acceleration is zero,  i) Calculate the wheel slip if vehicle speed is matching with wheel speed?  ii)Calculate wheel slip for Fl(Front left) and Fr(Front right), when vehicle speed is 70kph and WssFl(Wheel speed front left) and WssFr(Wheel speed front right) are reading 58 kph and 68 kph respectively  iii) Calculate wheel slip when panic braking is done at 150kph and ABS is shut down due to pump failure? | | | 08 | 2 | 2 | 2 | 1.4.1 |
| 1b | Answer the following with respect to FlexRay communication protocol.   1. Bus Level 2. Bus Guardian 3. Communication Cycle | | | 06 | 3 | 3 | 1 | 1.4.1 |
| 1c | Suggest and explain the sensor used for closed loop operation of an engine control system to maintain desired air/fuel ratio. | | | 06 | 2 | 3 | 2 | 2.1.2 |
| 2a | Explain the construction and working principle of magnetic reluctance angular position sensor. What is the drawback of this sensor and how it is overcome? | | | 08 | 2 | 3 | 1 | 1.4.1 |
| 2b | What is ride and handling of an automobile? How electronic suspension system manages the compromise between ride comfort and handling? | | | 06 | 2 | 3 | 2 | 2.1.2 |
| 2c | Compare event driven and time triggered communication strategies. Calculate nominal and maximum THeader , TResponse and TFrame, if LIN is operating at 10 Kbps baud rate and reserved time is set to 30% for transmitting four bytes of data. | | | 06 | 3 | 2 | 1 | 1.4.1 |
| 3a | Answer the following with respect to CAN communication  i) The CAN node receives the message as 1011110, state whether the received information is error free or not. Assume CRC with a generator polynomial as 1011.  ii) How small nodes can be kept from overloading with received messages  iii) Message prioritization in case of CAN protocol.  iv) Draw the message sequence seen by the CAN bus for the given scenario.  C:\Users\giree\Desktop\New Microsoft PowerPoint Presentation21.jpg | | | 08 | 3 | 3 | 1 | 1.4.1 |
| 3b | Discuss the operation of solenoid valve and its applications. | | | 06 | 2 | 2 | 1 | 1.4.1 |
| 3c | The fast moving car is turning at the corner, if the vehicle is turning less/more than the driver’s intention suggest a suitable control system along with the break circuit configuration to overcome this condition. | | | 06 | 2 | 2 | 2 | 2.1.2 |