|  |  |  |  |
| --- | --- | --- | --- |
| **Course Name:** | **Basic Electronic Circuits** | **Semester:** | **III** |
| **Date of Performance:** | **26/10/2020** | **Batch No:** | **B2** |
| **Faculty Name:** | **BPK** | **Roll No:** | **1912052** |
| **Faculty Sign & Date:** |  | **Grade/Marks:** | **/25** |

**Experiment No: 10**

**Title: Study of MOSFET CS amplifier**

|  |
| --- |
| **Aim and Objective of the Experiment:** |
| To Study MOSFET CS amplifier as an amplifier |

|  |
| --- |
| **COs to be achieved:** |
| CO3 |

|  |
| --- |
| **Theory:** |
| Enhancement MOSFETS, or E-MOSFETS, only conduct when a suitable gate-to-source positive voltage is applied, unlike Depletion type MOSFETs which conduct only when the gate voltage is zero.  However, due to the construction and physics of an enhancement type MOSFET, there is a minimum gate-to-source voltage, called the threshold voltage VTh that must be applied to the gate before it starts to conduct, thus allowing the drain current to flow.  In other words, an E-MOSFET does not conduct until the gate-source voltage, VGS is less than the threshold voltage, VTh.  When signal (Vin) is applied, Vgs swings above and below its zero value , producing a swing in drain current Id .  A small change in gate voltage produces a large change in drain current as in JFET . This fact makes MOSFET capable of raising the strength of a weak signal; thus acting as an amplifier.  During the positive half-cycle of the signal, the positive voltage on the gate increases and produces the enhancement-mode .This increases the channel conductivity and hence the drain current .  During the negative half-cycle of the signal, the positive voltage decreases and produces depletion-mode. This decreases the conductivity and hence the drain current .  The result of above action is that a small change in gate voltage produces a large change in the drain current.  This large variation in drain current produces a large a.c. output voltage across drain resistance RD. |

|  |
| --- |
| **Circuit Diagram/ Block Diagram:** |
|  |

|  |
| --- |
| **Stepwise-Procedure:** |
| 1. Open a new Schematic. 2. Draw the Circuit As Shown. 3. Note down the parameters as per the observation table. |

|  |
| --- |
| **Observation Table:** |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Vin (peak) | Vout (peak)  (bypassed ) | Vout  (unbypassed ) | Av  (bypassed ) | | Av  (unbypassed ) | | |  |  |  | Cal | Obs | Cal | Obs | | 10mv | -52.77463mV | -21.747936mV | -5.3856 | -5.2774 | -2.17858 | -2.17479 | |

|  |
| --- |
| **Calculation:** |
| Av (bypassed) and Av(un-bypassed) using ac analysis. |

|  |
| --- |
| **Waveform** |
| Input and output waveforms  With CS    Without CS |

|  |
| --- |
| **Post Lab Subjective/Objective type Questions: (hand written)** |
| 1. Add a Load resistance of 1K, 10K and 100K and justify the change in output.   1K      Output -52.771345mV peak to peak  10 K      Output -52.768874mV peak to peak  100K      Output -52.77632mV peak to peak   1. Implement a common drain MOSFET amplifier using SPICE. |

|  |
| --- |
| **Conclusion: (to be written in own words)** |
| We learnt about CS amplifier using LTspice |

|  |
| --- |
| **Signature of faculty in-charge with Date:** |