National Institute of Technology, Hamirpur (HP) End Semester Examination - May 2023
Course - B. Tech. Engineering Physics

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Semester - WIth
Subject Code - PH-322, Subject Name - Analog and Digital Electronics
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                                    Time: 3:00 Hours
    All questions are compulsory. Write the answers point-wise.

## Ques 1:

a) Fill the blank space $(1-\alpha)(1+\beta)=$.
b) What will be the stability factor (S) in fixed biased circuit if $\beta=100$ ?
c) Negative feedback is essential for a circuit to oscillate. (True / False).
d) Calculate the drain current in n-channel enhancement type MOSFET
$V_{\mathrm{Gi}}=4$ Volts, and $\mathrm{V}_{\mathrm{T}}=2 \mathrm{~V}$.
e) Write decimal equivalent number corresponding to a binary number 1010 .
f) How many flip-flops are required for mod-32 counter
g) In a 4-bit resistive divider network circuit, what is the corr 0101?
h) Give two example of primary memory/storage.
i) Cache memory is the example of (a) Primary memory [ ] or (b) Secondary memory [ ]
j) Hard disk drives (HDD), SSDs, optical disks, and USB flash drives are example of ..

Ques 2: How many classifications of
Graphically show the common emitter Class-A and Class -B indiction on the basis of mode of operations? each.

Ques 3: Draw gain v/s frequency plot for an Op-Amp. Define cutoff frequency of op-amp. Give the equation for unit gain frequency. Determine the cutoff frequency of an op-amp having specified values $B_{1}=1 \mathrm{MHz}$, and $A_{\mathrm{VD}}=200 \mathrm{~V} / \mathrm{mV}$.

Ques 4: Draw the construction diagram of n-channel depletion type MOSFET with its working. Plot the output characteristics and transfer characteristic of this MOSFET for different values of positive and
negative $V_{G S S}$.

Ques 5: Describe, with a circuit diagram, the working of Hartley oscillator, giving expression for its
frequency of oscillations.
Ques 6: What is the advantage of J-K flip flop? Make a logic circuit diagram of positive edge trigger J-K flip flop with its symbol and truth table.

Ques 7: Draw a 4-bit binary ladder circuit for digital-to-analog converter. Deduce the formula for analog output voltage for $n$-bit binary number. What will be the analog voltage corresponding to 4 -bit binary
number 1110 ?

Ques 8: What is the use of registers in digital electronics/circuits? Construct a 4-bit serial input-serial output shift register using D Flip flop (negative edge triggered), and draw a waveform diagram (suppose that initially the stored number is 0101).

Ques 9: Make a block diagram of 3-bit binary Asynchronous ripple counter with truth table and waveform diagram. What is the main disadvantage of ripple counter?

