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## To be filled in by the candidate

$\qquad$ Year/Semester Examinations, 20.
Subject $\qquad$
Name of the Paper $\qquad$
No. of additional sheets (if any) :-

## Instructions to candidate

Please read this instructions carefully before you start writing your answers.

1. This answerbook has 28 pages. Please check before writing whether the book is complete and in good condition.
2. Please furnish all the details asked for at the space provided in the main answer book and the additional answer book, if any.Writing this details anywhere else on the answer book will invalidate your examination.
3. Do not write your name or the name of your College/ Institutions anywhere or anything else, which is not a part of your answer.
4. Write legibly on both sides of the paper. Strating from Page No. 1
5. You may use some space for your rough notes or calculations on the a nswer book if you so desire. These rough notes, calculations must be scored out before submitting the answer book.
6. Do not bring any book or loosepaper in the examination hall.
7. Do not tear any page from the Answer Book.
8. Do not write anything on the question paper or blotting paper or any pieces of paper while you are in the examination hall.
9. Any act of indiscipline or misbehaviour in the examination hall will result in your expulsion.
10. No examinee is allowed to leave the examination hall until 30 (thirty) minutes lapse after the commencement of the examination.
11. Additional answer sheet will be supplied after the main answer book is exhausted.
12. Use of cell phone, calculator or any electronic devises in the examination hall is strictly prohibited unless specified in the Question Paper.


To be filled in by the candidate

Year/Semester

EXAMINATIONS 20 $\qquad$

ROLL NO. $\qquad$

REGD. NO. $\qquad$
SUBJECT $\qquad$

PAPER/COURSE NO. : $\qquad$

No. of addl. sheets (if any) :-

# 2020 <br> (CBCS ) <br> (FOURTH SEMESTER) <br> ELECTRONICS <br> (Pulse Switching Circuits) 

Full Marks: 50
Time: 3 hours

## Instructions:

1. Questions should be attempted as per instructions.
2. Do not copy the Questions. Indicate the Questions No. clearly while attempting the answer.
3. Multiple choice answer should indicate the Question No., Sub. No., (if any) and the correct answer. For example-
4. Name the state capital of Mizoram.
(a) Lunglei (b) Aizawl (c) Champhai

Candidate should provide answer as Q. No. 1: (b) Aizawl [Candidate should avoid writing only (b)]
4. The figures in the margin indicate full marks for the questions.
5. Separate answer script should be used.
(SECTION: A - OBJECTIVE)
(Marks: 10)
Choose the correct answer from the following questions: $\quad \mathbf{1 \times 1 0}=\mathbf{1 0}$

1. Negative feedback is employed in
(a) oscillators
(b)rectifiers
(c) amplifiers
(d)transducer
2. The gain of an amplifier with feedback is known as
(a) closed-loop gain
(b)open-loop gain
(c) resonant gain
(d)current gain
3. For sustaining oscillation in an oscilator
(a) No feedback
(b) phase shift should be $90^{\circ}$
(c) feedback should be negative
(d) feedback factor should be unity
4. In a transistor Hartley oscillator
(a) inductive feedback is used
(b)untapped coli is used
(c) entire coil is in the output circuit
(d)no capacitor is used
5. An important limitation of a crystal oscillator is
(a) its high Q
(b)its low output
(c) less availability of quartz crystal
(d)its high output
6. In a Wien bridge oscillator, if the resistances in the positive feedback circuit are decreased, the frequency
(a) remains the same
(b)decreases
(c) increases
(d)insufficient data
7. A bistable multivibrator has
(a) two stable states
(b) one stable state
(c) no stable state
(d) three stable states
8. The frequency of oscillation of an astable multivibrator depends on the
(a) value of transistor $\beta$
(b) value of collector load resistors
(c) RC values of the circuit
(d) width of the input pulse
9. The number $1000_{2}$ is equivalent to decimal number
(a) one thousand
(b) eight
(c) four
(d) sixteen
10. In Boolean algebra, the bar sign (-) indicates.
(a) OR operation
(b) AND operation
(c) NOT operation
(d) none of the above

## (SECTION: B - SHORT NOTES)

## (Marks: 10)

## Answer any four questions of the following:

$2^{1 / 2} \times 4=10$

1. Show that the application of negative feedback reduces distortion and noises in an amplifier

## Or

Why is feedback necessary in an amplifier? Draw a circuit diagram of negative feedback amplifier showing the components of feedback circuit.
2. What is oscillator? Distinguish between damped and undamped oscillator.

## Or

For the Hartley oscillator, $\mathrm{C}=250 \mathrm{pF}, \mathrm{L}_{1}=1.5 \mathrm{mH}, \mathrm{L}_{2}=1.5 \mathrm{mH}$ and $\mathrm{M}=0.58 \mathrm{mH}$. Determine the operating frequency
3. Write the circuit diagram of phase-shift oscillator. Also write its advantages and disadvantages

Or
Discuss the condition for stability of oscillator.
4. What is the basic difference among the three types of multivibrators?

Or
Write the uses of Schmitt trigger.
5. Divide $1110011_{2}$ by $101_{2}$ using binary division method.

Or
Write the symbol and truth table of NOR gate
(SECTION: C - DESCRIPTIVE)
(Marks: 30)
The questions are of equal values

## Answer any three from the following questions:

$10 \times 3=30$

1. (a) What is feedback in an amplifier? With appropriate diagrams, explain the working of positive and negative feedback amplifiers.
(b) When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 50 . (i) calculate the fraction of the output voltage feedback (ii) If this faction is maintained, calculate the value of amplifier gain required if the overall stage gain is to be 75 .
(c) Why is negative feedback applied in high gain amplifiers?

OR
2. (a) Show that in a Negative Feedback Amplifier, the gain is stabilized.
(b) Explain different types of negative feedback with diagrams.
3. (a) Derive the frequency of oscillation and condition for sustained oscillation of Colpitt's oscillator.
(b) Explain the circuit operation of tuned collector and derive its frequency of oscillation

## OR

4. (a) Explain the constructions and operations of series-fed and shunt-fed Hartley oscillators.
(b) The tuned collector oscillator circuit used in the local oscillator of a radio receiver makes use of an LC tuned circuit with $\mathrm{L}_{1}=58.6 \mu \mathrm{H}$ and $\mathrm{C}_{1}=300 \mathrm{pF}$. Calculate the frequency of oscillations.
(c) Find the operating frequency of a transistor Hartley Oscillator if $\mathrm{L}_{1}=$ $50 \mu \mathrm{H}, \mathrm{L}_{2}=1 \mathrm{Mh}$ and mutual inductance $\mathrm{M}=10 \mu \mathrm{H}$ and $\mathrm{C}=10 \mathrm{pF}$.
5. (a) With circuit diagram, explain the operation, advantages and disadvantages of Wien bridge oscillator.
(b) A crystal has a parameters $\mathrm{L}=3.3 \mathrm{H}, \mathrm{C}=0.65 \mathrm{pF}, \mathrm{R}=5.5 \mathrm{k} \Omega$ and $\mathrm{C}_{\mathrm{s}}$ $=10 \mathrm{pF}$. Calculate (i) series resonant frequency (ii) parallel resonant frequency.
(c) In the phase shift oscillator, $\mathrm{R}_{1}=\mathrm{R}_{2}=\mathrm{R}_{3}=1 \mathrm{M} \Omega$ and $\mathrm{C}_{1}=\mathrm{C}_{2}=\mathrm{C}_{3}=$ 68 pF . At what frequency does the circuit oscillate?

## OR

6. (a) What is piezo electric effect? Explain series and parallel resonant frequencies from crystal oscillator equivalent circuit.
(b) In the Wien Bridge oscillator, $\mathrm{R}_{1}=\mathrm{R}_{2}=220 \mathrm{k} \Omega$ and $\mathrm{C}_{1}=\mathrm{C}_{2}=250$ pF . Determine the frequency of oscillations?
(c) For a tunnel diode, $\mathrm{L}=1.0 \mu \mathrm{H}$, and $\mathrm{C}=40 \mathrm{pF}$. If the negative resistance region of the diode characteristics has a negative slope $r_{d}=200 \Omega$ and the bulk resistance of the device $\mathrm{R}_{\mathrm{B}}=25 \Omega$, does the circuit produce oscillations?
7. (a) Explain the construction, operation of Astable multivibrator.
(b) Why is Schmitt Trigger called emitter-coupled binary? Write the uses of Schmitt Trigger.

## OR

8. (a) With a neat sketch, explain the construction and operation of Monostable multivibrator.
(b) In the astablemultivibrator shown below, $\mathrm{R}_{2}=\mathrm{R}_{3}=10 \mathrm{k} \Omega$ and $\mathrm{C}_{1}=$ $\mathrm{C}_{2}=0.01 \mu \mathrm{~F}$. Determine the time period and frequency of the square wave.

9. (a) With the help of logic ciruit diagram, explain the operation and truth table of XOR gate.
(b) Write the symbol and truth table of AND gate
(c) Convert the binary fraction 0.101 into its decimal equivalent

## OR

10. (a) Write the construction and working of half subtractor.
(b) Using 1's complemental method, subtract $01101_{2}$ from $11011_{2}$.
(c) With logic circuit, obtain the truth table for a NAND and NOR gate.
