D 130254 **(Pages : 2)** **Name.....**

Reg. No.....

FIFTH SEMESTER (CBCSS—U.G.) DEGREE EXAMINATION
NOVEMBER 2025

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Syllabus)

Time : Two Hours Maximum : 60 Marks

Section A

Answer **all** *questions in two* **or** *three sentences, each correct answer carries a maximum of* 2 *marks.*

1. How does the output of a bridge rectifier differ from a pure DC signal ?
2. What is the logical expression for a NAND gate ?
3. What are the three basic transistor amplifier configurations ?
4. Give the expression for the voltage gain of a CE amplifier.
5. What is a Zener diode, and what is its special characteristic ?
6. What are the three basic transistor amplifier configurations ?
7. Convert the binary no 101111 to Octal and decimal base
8. How can you implement an OR gate using only NAND gates ?
9. Simplify the expression : A + AB'
10. Which transistor configuration has a voltage gain of approximately one ?
11. Draw the circuit of the integrator using an op-amp.
12. What are universal gates, and why are they called so ?

(Ceiling 20 marks)

Turn over

Section B

Answer **all** *questions in a paragraph of about* **half a page** *to* **one page**, *each correct answer carries a maximum of* 5 *marks.*

13. Describe the nature of the output waveform of a bridge rectifier.
14. What is the function of a capacitor in a filter circuit ?
15. Why is the Common Emitter (CE) configuration widely used in amplifiers ?
16. What is the input and output impedance of a Common Base (CB) amplifier ?
17. Design a full adder using only NAND gates. Explain how it implements the addition of two binary digits.
18. Compare and contrast the RS flip-flop and the JK flip-flop. Discuss the advantages and disadvantages of each.
19. With a neat diagram explain the working of an Op-Amp as a differentiator.

(Ceiling 30 marks)

Section C

Answer any **one** *question in about* **two pages**, *the question carries* 10 *marks.*

20. With a neat Diagram Explain the significance of cut-off and saturation points in a transistor CE amplifier and how they affect the amplifier's performance.
21. Draw a neat diagram of an oscillator circuit. Explain the role of the active device (transistor or op-amp) in it. How does it contribute to the generation and sustainment of oscillations ?

(1 × 10 = 10 marks)

D 110237 **(Pages : 2)** **Name.....**

Reg. No.....

FIFTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2024

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

Section A

Answer **all** *questions in two* **or** *three sentences, each correct answer carries a maximum of* 2 *marks.*

1. What is the main advantage of a bridge rectifier over a half-wave rectifier ?
2. Construct AND, OR and NOT gates using NOR gates.
3. Draw the dc and ac equivalent circuit of a CE transistor amplifier.
4. The voltage gain of an amplifier without feedback is 2500. If a negative feedback fraction of 0.01 is applied, find the voltage gain of the amplifier.
5. What is a voltage doubler ?
6. What is the formula for power gain of a CE amplifier ?
7. Convert the binary no 1001110 to Octal and hexadecimal base
8. How do you obtain the 2's complement of a binary number ?
9. Simplify the expression : $A \cdot (B + B')$.
10. How does the voltage gain of a CE amplifier compare to a CB amplifier ?
11. Draw the circuit of the differentiator using an op amp.
12. What is an exclusive or gate ? How would you realise it using Nand gates ?

(Ceiling - 20 marks)

Turn over

Section B

Answer **all** *questions in* **a paragraph** *of about* **half a page to one page,**
each correct answer carries a maximum of 5 *marks*

13. Define the efficiency of a Full wave rectifier and explain how it is calculated.

14. Discuss the methods used to reduce ripple in the output of a rectifier.

15. Compare the characteristics of the Common Base, Common Emitter, and Common Collector amplifier configurations

16. With a neat diagram explain the voltage divider bias for a transistor.

17. Simplify the following Boolean Expressions :

    a) $\overline{A\overline{B} \bullet \left(\overline{A} + B\right)}$; and

    b) $\overline{A\overline{B}C + B\overline{C}}$.

18. Explain the working of a JK Flip-Flop with a neat diagram.

19. Draw the circuit diagram of a full adder using only NOR gates and obtain the truth table.

(Ceiling - 30 marks)

Section C (Essays)

Answer in about **two pages**, *any* **one** *question.*
Answer carries 10 *marks.*

20. With a neat Diagram explain the saturation and cut off for a CE amplifier. Derive the expressions for its voltage gain, current gain and power gain.

21. What is the frequency of Oscillation for the following oscillators.

    i) Colpitt's Oscillator.

    ii) Phase Shift Oscillator.

    With a neat diagram explain the working of each of them.

(1 × 10 = 10 marks)

D 50693 **(Pages : 2)** **Name.....**

Reg. No.....

FIFTH SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2023

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

The symbols used in this question paper have their usual meanings.

Section A (Short Answer Type)

Answer **all** *questions in two* **or** *three sentences, each correct answer carries a maximum of* 2 *marks.*

1. Write the disadvantage of bridge rectifier.
2. Express the output frequency of a bridge rectifier in terms of input frequency.
3. Which are the rectifiers needed transformers ?
4. Mention different kinds of filter circuits.
5. Explain a voltage multiplier.
6. Define transistor load line.
7. What is thermal runaway ?
8. Define stability factor.
9. Define : (a) Decibel gain ; and (b) Bandwidth.
10. Explain negative feed back.
11. What is gain-bandwidth product (GBW) ?
12. Convert binary to decimal 11001010.

(Ceiling - 20)

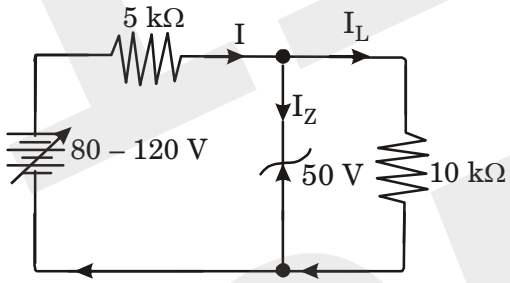
Turn over

11105

Section B (Paragraph / Problem Type)

Answer **all** *questions in a paragraph of about* **half a page** *to one page, each correct answer carries a maximum of* 5 *marks.*

13. For the circuit shown in Figure, find the maximum and minimum values of zener diode current.



14. With necessary diagrams analyse Rectifier Output.

15. Thepower supply A delivers 10 V d.c. with a ripple of 0.5 V r.m.s. while the power supply B delivers 25 V d.c. with a ripple of 1 mV r.m.s. Which is better power supply ? Explain.

16. A germanium transistor is to be operated at zero signal I_c = 1 mA. If the collector supply V_{cc} = 12 V, what is the value of R_B in the base resistor method ? Take β = 100.

17. Draw and explain DC and AC equivalent circuits of an amplifier.

18. Explain Inverting Amplifier. Derive its voltage gain.

19. Write and explain with example, De Morgan's theorem.

(Ceiling - 30)

Section C (Essay Type)

Essays - Answer in about **two pages**, *any* **one** *question.*
Answer carries 10 *marks.*

20. With necessary diagrams explain the input and output Characteristics of Common Emitter Connection

21. With figure explain the working of an RC coupled transistor amplifier. Explain frequency response. What are its advantageous and disadvantageous ?

(1 × 10 = 10 marks)

D 30587 **(Pages : 3)** **Name.....**

Reg. No.....

FIFTH SEMESTER (CBCSS–UG) DEGREE EXAMINATION, NOVEMBER 2022

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Admission onwards)

Time : Two Hours Maximum : 60 Marks

The symbols used in this question paper have their usual meanings.

Section A (Short Answer type)

(Answer **all** *questions in two or three sentences, each correct answer carries a maximum of* 2 *marks)*

1. Compare the efficiencies of different kinds of rectifiers.
2. Define a filter circuit.
3. Explain the operation of a Half-Wave Voltage Double.
4. Draw the circuit diagram of Common Emitter Connection.
5. Define transistor biasing.
6. What is the purpose of emitter bypass capacitor CE ?
7. Define a) gain b) frequency response.
8. List out the Advantages of Negative Voltage Feedback
9. What are the essentials of a transistor oscillator circuit ?
10. Define a Differential amplifier.
11. Define Slew Rate of an Op Amp.
12. Convert binary number 101011100 to octal.

(Ceiling - 20)

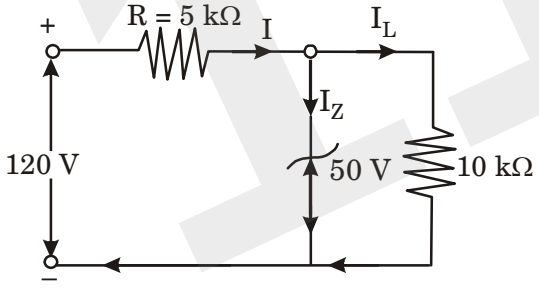
Turn over

11055

Section B (Paragraph / Problem type)

(Answer **all** *questions in a paragraph of about half a page to* **one page**, *each correct answer carries a maximum of* 5 *marks)*

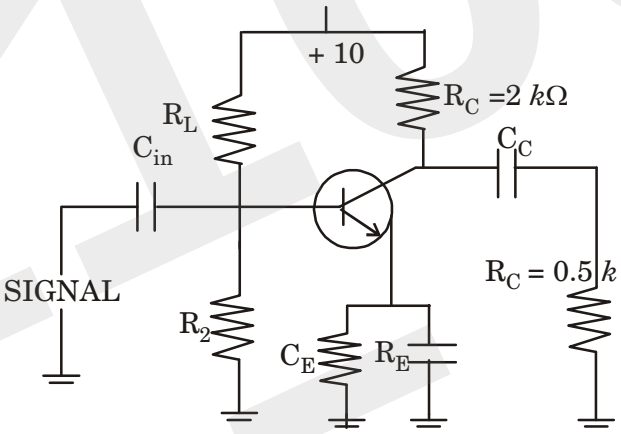
13. For the circuit shown find : (i) the output voltage ; (ii) the voltage drop across series resistance ; (iii) the current through zener diode.



14. Derive the equation to get maximum efficiency of a full wave rectifier

15. In a common base connection, current amplification factor is 0.9. If the emitter current is 1mA, determine the value of base current

16. In the circuit shown, find the voltage gain. Given that $\beta = 60$ and input resistance Rin = 1 $k\Omega$.



17. The voltage gain of an amplifier without feed back is 3000. Calculate the voltage gain of the amplifier if negative voltage feedback is introduced in the circuit.

18. What are binary number systems ? How can you convert binary to decimal ? Give example.

19. Differentiate between RS Flip Flop and JK Flip flop.

(Ceiling - 30)

Section C (Essay type)

(Essays - Answer in about two pages, any **one** *question.*
Answer carries 10 *marks).*

20. With figure explain the working of a bridge rectifier. Write down the advantageous and disadvantageous.

21. Explain Common Collector Connection. Define Current amplification factor. Obtain the relation between γ and α.

(1 × 10 = 10 marks)

D 10684 (Pages : 3) Name.....

Reg. No.....

FIFTH SEMESTER U.G. DEGREE EXAMINATION, NOVEMBER 2021

(CBCSS—UG)

Physics/Applied Physics

PHY 5B 09/APH 5B 09—ELECTRONICS (ANALOG AND DIGITAL)

(2019 Admissions)

Time : Two Hours Maximum : 60 Marks

The symbols used in this question paper have their usual meanings.

Section A

Answer at least **eight** *questions.*

Each question carries 3 *marks.*

All questions can be attended.

Overall Ceiling 24.

1. Define ripple factor of a rectifier. What is its value for a full wave rectifier ?
2. Explain the working of a π-filter.
3. Mention the merits of R-C coupled amplifiers.
4. Explain the decibel system of expressing power gain.
5. What is the role of a coupling capacitor in a multistage transistor amplifier ?
6. List down the advantages of negative feedback.
7. Define Common Mode Rejection Ratio (CMRR).
8. Explain the principle of an op-amp differentiator.
9. Convert the following decimal numbers into its binary equivalents.
   (a) 13.7. (b) 0.85.
10. Subtract 1010 from 1101 using 1's complement method.
11. Why NAND gate is called '*a*' miversal gate ?
12. What is meant by toggle condition in JK flip flops ?

(8 × 3 = 24 marks)

Turn over

Section B

Answer at least **five** *questions.*

Each question carries 5 *marks.*

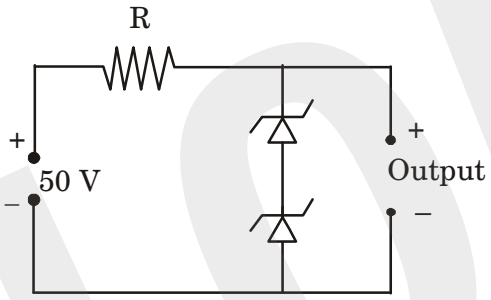
All questions can be attended.

Overall Ceiling 25.

13. The circuit uses two zener diodes, each rated 15 V, 200 mA. If the circuit is connected to a 50 Volt unregulated d.c. supply. Determine

    (a) The regulated output voltage.

    (b) The value of series resistance R.



14. Draw the input and output characteristics of Common Emitter (CE) configuration. What are the inferences ?

15. For the transistor amplifier shown in figure :

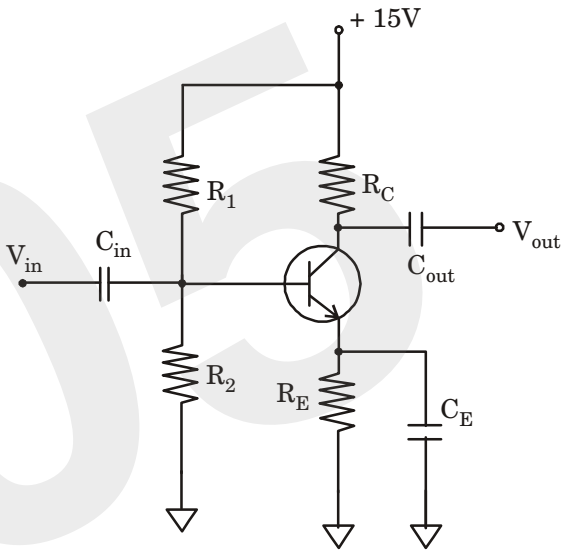
R_1 = 10 kΩ

R_2 = 5 kΩ

R_C = 1 kΩ

R_E = 2 kΩ

V_{BE} = 0.7 Volt



(i) Draw the d.c. loadline.

(ii) Determine the operating point.

16. With a negative voltage feedback, an amplifier gives an output of 10 V with an input of 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate : (i) Gain without feedback ; (ii) Gain with feedback ; and (iii) Feedback fraction.

17. A phase shift oscillator uses 0.01 μF capacitors. Find the value of Resistance R to produce a frequency of 800 Hz.

18. Describe the principle of a summing amplifier using op-amp.

19. Compute the following using 2's complement method :

(a) 25 - 18. (b) 9 - 12.

(5 × 5 = 25 marks)

Section C (Essay Type)

Answer any **one** *question.*

The question carries 11 *marks.*

20. Describe voltage divider biasing in detail. Explain how stability is achieved in this method.

21. Explain the principle of a full adder with suitable diagrams and truth table.

(1 × 11 = 11 marks)