



Reg. No. : .....

Name : .....

**Fifth Semester B.Sc. Degree Examination, October 2015**  
**First Degree Programme under CBCSS**  
**PHYSICS**  
**Core Course VII**  
**PY 1543 : Electronics**

Time : 3 Hours

Max. Weight : 30

**SECTION – A**

This Section contains **four** Bunches **each** of **four** questions. Answer **all** questions.  
**Each** bunch carries a Weightage of **one**.

**BUNCH – I**

1. A semiconductor that is electrically neutral has
  - a) No majority carrier
  - b) No minority carrier
  - c) No free charges
  - d) Equal Number of positive and negative charges
2. By introducing a CLC filter to a full wave rectifier circuit, The ripple factor of the output gets
  - a) increased
  - b) reduced
  - c) unpredictable
  - d) no change
3. When forward biased an ideal PN junction diode will act as a
  - a) current source
  - b) open switch
  - c) closed switch
  - d) emitter
4. Out of the three regions of a transistor \_\_\_\_\_ region is heavily doped than other two.
  - a) base
  - b) collector
  - c) emitter
  - d) no





## BUNCH - II

5. Point of intersection of ac and dc load line is called
  - a) operating point
  - b) active region
  - c) cutoff region
  - d) knee voltage
6. In CB configuration of a transistor output is taken between \_\_\_\_\_ of the transistor.
  - a) collector and base
  - b) emitter and base
  - c) collector and emitter
  - d) earth and base
7. In a Push-Pull amplifier, each transistor acts as class \_\_\_\_\_ amplifier.
  - a) A
  - b) B
  - c) C
  - d) AB
8. An emitter follower amplifier is a \_\_\_\_\_ amplifier.
  - a) Voltage series
  - b) Voltage shunt
  - c) Current series
  - d) Current shunt

## BUNCH - III

9. In a Crystal oscillator quartz crystal is used to
  - a) replace tank circuit
  - b) replace feed back circuit
  - c) stabilize frequency
  - d) increase bandwidth
10. Slope detection technique is used to demodulate \_\_\_\_\_ signals.
  - a) FM
  - b) AM
  - c) PM
  - d) Both AM and FM
11. Compared to AM, FM transmission requires a \_\_\_\_\_ bandwidth.
  - a) narrower
  - b) wider
  - c) single sided
  - d) double sided
12. A device which turns on and conducts current in either direction when break over voltage is exceeded is
  - a) SCR
  - b) DIAC
  - c) TRIAC
  - d) Both b and c

## BUNCH - IV

13. The Gate terminal of a MOSFET is isolated from the semiconductor by a thin layer of
- a) Germanium                      b) Silicon  
c) Silicon dioxide                d) Gallium Arsanide





14. In the active region of operation of a MOSFET the drain current  $I_d$  is a function of
  - a)  $V_{GS}$
  - b)  $V_{DS}$
  - c)  $V_{CB}$
  - d)  $V_{CE}$
15. Input resistance for an ideal OP-AMP is
  - a) zero
  - b) infinity
  - c) unity
  - d) less than zero
16. Voltage gain for an ideal OP-AMP is
  - a) zero
  - b) infinity
  - c) unity
  - d) less than zero

### SECTION – B

Answer **any eight** questions. **Each** question carries a Weightage of **one**.

17. Mention two types of extrinsic semiconductors and how do they differ in charge carriers ?
18. What is rectifier efficiency ? What is its maximum value for a half wave rectifier ?
19. PIV is important factor in selecting a diode for rectification. Why ?
20. What is an emitter follower ? What is its use in electronics ?
21. Write the advantages of biasing an NPN transistor in base resistor method.
22. Explain the term inter-modulation distortion in multistage amplifier.
23. What are the advantages of FM over AM ?
24. Mention any 2 applications of a Triac.
25. What is meant by Pinch off voltage ?
26. Why BJT is called a bipolar device while FET is called unipolar device ?
27. What is meant by slew rate of an opamp ?
28. What is the significance of CMRR when selecting an OP-AMP ?





## SECTION – C

Answer **any five** questions. **Each** question carries a Weightage of **two**.

29. A zener diode of break down voltage 6.2V is used to regulate an input voltage that fluctuates between 9V and 12V. It is connected across a load of  $1K\Omega$  and a series resistor of  $330\Omega$ . Calculate the maximum value of zener current.
30. A transistor has  $\alpha = 0.98$  and  $I_B = 100\mu A$  and  $I_{CO} = 6\mu A$ . Calculate  $I_C$  and  $I_E$ .
31. In a common emitter transistor amplifier when the signal changes by 0.02V, the base current changes by  $10\mu A$  and collector current changes by 1mA. Find current gain and input impedance.
32. A transistor in CE configuration has  $h_{fe} = 110$  and  $h_{ie} = 1K\Omega$  respectively. It is used as a single stage amplifier for amplifying low voltage signal with a collect load of  $2.2K\Omega$ . Calculate its current gain voltage gain and input resistance.
33. Find the operating frequency of a colpitts occilator if  $C_1 = .005\mu F$ ,  $C_2 = .01\mu f$  and  $L = 10\mu H$ .
34. A differential amplifier has a typical common mode gain of 35 dB and CMRR of 72dB. Find the output voltage when 16mV is applied to inverting terminal and 18mV is applied to non-inverting terminal.
35. The maximum peak to peak voltage of an AM wave is 16mV while the minimum peak to peak voltage is 8mV. Find the percentage of modulation.
36. Drain current of an FET changes from 1mA to 1.4mA when its gate source voltage changes form  $-3V$  to  $-3.1V$ , while the drain source voltage remains unchanged. Calculate the trans conductance of the FET.

## SECTION – D

Answer **any two** questions. **Each** question carries a Weightage of **four**.

37. With the help of neat diagram explain voltage current characteristics of a PN junction silicon diode. Derive an expression connecting forward dynamic resistance and current through the diode.
  38. Mention the advantages and disadvantages of negative feed back amplifiers.
  39. With the help of neat diagram and theory explain how an OP-AMP can be converted into a summing amplifier.
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