## SECTION – D

Answer **any one** question. Weightage **4** :

29. Describe the construction and working of
    a) Differentiator
    b) Integrator.

    What are their applications ?

30. Explain the concept of power amplification. Draw the circuit of a class A power amplifier and explain how it works. Determine the voltage gain, output power and efficiency. (1×4W=4 W)

---

Reg. No. : ..................................

Name : ..................................

### V Semester B.Sc. Degree (CCSS-Reg./Supple./Imp.) Examination, November 2014 (2012 Admn.)
### CORE COURSE IN PHYSICS
### 5B09 PHY : Basic Electronics

Time : 3 Hours                                      Max. Weightage : 30

## SECTION – A

Answer **all** questions :

1. If the input coupling capacitor is open, the AC input voltage will
   a) Decrease                    b) Increase
   c) Be zero                     d) None of these

2. The maximum efficiency of a push-pull amplifier is
   a) 25%                         b) 50%
   c) 78.5%                       d) 90%

3. At the unity-gain frequency the open loop voltage gain is
   a) Zero                        b) Infinity
   c) One                         d) Avmd

4. A transistor acts like a diode and
   a) Voltage source              b) Current source
   c) Resistance                  d) Power supply

5. The pinch off voltage has the same magnitude as the
   a) Gate voltage                b) Gate source voltage
   c) Gate source cut off voltage d) Drain source voltage

P.T.O.

6. The base of an npn transistor is thin and

   a) Metallic    b) Heavily doped

   c) Lightly doped    d) Insulated

7. The Hartley oscillator uses

   a) Negative feedback    b) Two inductors

   c) A tickler coil    d) Tungsten lamp

8. A summing amplifier can have

   a) No more than two input signals

   b) Two or more input signals

   c) A closed loop input impedance of infinity

   d) Small open loop voltage gain    (2×1W=2 W)

## SECTION – B

Answer **any six** questions. Weightage **1 each** :

9. Draw the output characteristics of an NPN transistor in CE configuration. Define beta of transistor.

10. What is Quiescent point ? Show graphically.

11. Define slew rate of an opamp. What is the slew rate of opamp 741C ?

12. Define CMMR of an opamp. What is its value in the case of an ideal opamp ?

13. Explain the Barkhauesen criteria for oscillations.

14. What is miller effect ? How does it affect the gain of a CE amplifier ?

15. Compare the different amplifier configurations.

16. How does gate voltage control drain current in a JFET ?    (6×1W=6 W)

## SECTION – C

Answer **any nine** questions. Weightage **2 each**

17. Explain the difference between dc and ac voltage followers.

18. What is a non inverting amplifier ? 741 C is connected as a non inverting amplifier for a gain of 100. Determine the stability of the amplifier at this gain.

19. Explain the voltage divider bias method of biasing a transistor. Why is it a popular bias circuit ?

20. Draw the ac equivalent circuit of a CE amplifier and obtain an expression for the voltage gain.

21. Explain the principle of feedback amplifiers. Compare positive feedback and negative feedback.

22. What are the advantages of negative feedback ? An amplifier has an open loop gain of 400 and a feedback factor of 0.2. Find the percentage change in closed loop gain if the open loop gain changes by 25%.

23. Explain an integrating circuit. What are their uses ?

24. Explain Gate bias and Self bias method of FET biasing.

25. For a N channel JFET, $I_{DSS} = 8.7mA$, $V_p = -3V$, $V_{GS} = -1V$. Find the values of
    a) $I_D$
    b) $g_{mo}$
    c) $g_m$

26. Draw the transfer characteristic of JFET. For a JFET, $I_{DSS} = 16mA$ and $V_{GS(off)} = -5V$. Determine the drain current $I_D$ for $V_{GS} = 0V, -1V$, and $-4V$

27. In a negative feedback amplifier, $A = 100$, $B = 0.04$ and $Vi = 50mV$. Find
    a) Gain with feedback
    b) Output voltage
    c) Feedback factor
    d) Feedback voltage

28. Explain the principle of working of a differential amplifier. Define CMRR. What is its value for an ideal opamp ?    (9×2W=18 W)