PART – D

Answer **any one**. **Each** question carries weightage of **4**.

23. Describe the constructor and operation of a FET. Define the parameter of the FET and obtain the relation between them.

24. Explain the working of a Colpitts oscillator and give the expression for frequency of oscillation and the condition for starting of oscillation. **(1×4=4)**

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Reg. No. : .....

Name : .....

V Semester B.Sc. Degree (CCSS – Reg./Supple./Imp.) Examination, November 2014
CORE COURSE IN PHYSICS
5B09 PHY : Basic Electronics
(2011 and Earlier Admissions)

Time : 3 Hours Max. Weightage : 30

PART – A

Choose the correct answers. **Each** bunch carries a weightage of **1**.

1. i) A transistor can act as a switch when it operate between
   a) cut off region and active region
   b) active region and saturation region
   c) cut off and saturation
   d) none of the above

   ii) Beyond pinch-off voltage, the drain to source resistance of a JFET is
   a) zero b) low c) high d) medium value

   iii) For a common emitter BJT, β is given by
   a) $\beta = \frac{\alpha}{1+\alpha}$ b) $\beta = \frac{\alpha}{1-\alpha}$
   c) $\beta = \frac{1+\alpha}{1-\alpha}$ d) $\beta = \frac{\alpha^2}{1+\alpha}$

   iv) CE amplifier is characterized by
   a) low-voltage gain b) small phase reversal
   c) high power gain d) very high output impedance

2. i) To produce sustained oscillation, the positive feed back should be such that the loop gain is at least

   a) ≥ 1 b) 0

   c) < 1 d) none of the above

   ii) The output wave form of an op-amp differentiator for a triangular wave input is

   a) triangular wave b) sine wave

   c) cosine wave d) square wave

   iii) According to Barkhausen criterion

   a) $A\beta = 1$ b) $A\beta = > 1$ c) $A\beta = < 1$ d) $A\beta = 0$

   iv) In a full wave rectifier frequency of input signal is 50 Hz. Then the frequency of output is

   a) 25 Hz b) 50 Hz

   c) 75 Hz d) 100 Hz **(2×1=2)**

PART – B

Answer **any six**. **Each** question carries a weight. of **1**.

3. What is DC load line ?
4. Why we need Biasing of transistor ?
5. What are h parameters ?
6. Briefly explain voltage divides bias.
7. Distinguish between Class A and Class B amplifier.
8. What is Barkhausen criterion ? Derive the condition.
9. Draw the circuit of a OP-AMP differentiator.
10. Draw the circuit of Zener regulator and give its working. **(6×1=6)**

PART – C

Answer **any nine. Each** question carries a weightage of **2**.

11. Compare the different biasing of transistor.
12. Define h-parameters for the port network ? Why are h-parameter circuits widely used ?
13. Compare and contrast between n channel FET and P channel FET.
14. How is efficiency of a power amplifier defined ? What is its significance ? What is cross over distortion in power amplifier ?
15. State the condition of balancing of Wein-Bridge oscillator. Draw the circuit of it and explain its operation.
16. State and explain the possible interconnection between amplifier and oscillator.
17. An amplifier has a bandwidth of 500 kHz and voltage gain of 100. If the bandwidth is extended to 5 MHz what should be the negative feed back ?
18. Describe an inverting op-amp. Derive an expression for its voltage gain.
19. How would you design an op-amp addes circuit to find the average of three input signal ?
20. Calculate the output voltage in an op-amp differentiator if the rate of the charge of voltage across the capacitor of value 0.01 PF is 1 volt per millisecond. The value of the feedback resistor is 1 megohm.
21. Describe and explain the circuit and operation of transistor series regulater.
22. Explain the characteristics of JFET with necessary diagram. **(9×2=18)**