SSR DEGREE COLLEGE (AUTONOMOUS) NIZAMABAD
M.SC. PHYSICS (ELECTRONICS) PAPER-4
SEM – II INTERNAL - II
QUESTION BANKS

I.   Fill in the Blanks (with Answers)

1. Feedback in which a fraction of output is fed back to the input in opposite phase is called **negative feedback**.
   Answer: negative feedback
2. Negative feedback in amplifiers improves **stability** and **bandwidth**.
   Answer: stability, bandwidth
3. The feedback factor is defined as the ratio of **feedback signal to output signal**.
   Answer: feedback signal to output signal
4. The gain of a feedback amplifier is given by $A_f = \frac{A}{1 + A\beta}$.
   Answer: $\frac{A}{1 + A\beta}$
5. Positive feedback is essential for the operation of **oscillators**.
   Answer: oscillators
6. The condition for sustained oscillations is known as the **Barkhausen criterion**.
   Answer: Barkhausen criterion
7. According to Barkhausen criterion, the loop gain must be **unity**.
   Answer: unity ($|A\beta| = 1$)
8. In RC phase shift oscillator, the phase shift network provides **180°** phase shift.
   Answer: 180°
9. The Wien bridge oscillator produces a highly **stable sinusoidal** output.
   Answer: stable sinusoidal
10. LC oscillators generate oscillations due to the exchange of energy between **inductor and capacitor**.
    Answer: inductor and capacitor
11. The process of varying the amplitude of a high-frequency carrier by a low-frequency signal is called **amplitude modulation**.
    Answer: amplitude modulation
12. In frequency modulation, the **frequency** of the carrier varies in accordance with the modulating signal.
    Answer: frequency
13. In phase modulation, the **phase** of the carrier is varied by the modulating signal.
    Answer: phase
14. The modulation index of an AM wave is defined as the ratio of **modulating signal amplitude to carrier amplitude**.
    Answer: modulating signal amplitude to carrier amplitude
15. Over-modulation in AM occurs when the modulation index is **greater than unity**.
    Answer: greater than unity (m > 1)

16. The bandwidth of an AM signal is **twice the modulating frequency**.
    Answer: twice
17. FM provides better **noise immunity** than AM.
    Answer: noise immunity
18. The modulation index of FM is also known as the **deviation ratio**.
    Answer: deviation ratio
19. A balanced modulator produces **suppressed carrier** output.
    Answer: suppressed carrier
20. FM signals are commonly detected using a **discriminator** or **PLL detector**.
    Answer: discriminator

II. Multiple Choice Questions (MCQs)

1. The main advantage of negative feedback in an amplifier is:

A) Increase in gain
B) Increase in noise
C) Improvement in stability
D) Distortion increase

✅ **Answer:** C) Improvement in stability

2. Which type of feedback reduces distortion in amplifiers?

A) Positive feedback
B) Negative feedback
C) Regenerative feedback
D) No feedback

✅ **Answer:** B) Negative feedback

3. The Barkhausen criterion for oscillation requires:

A) $A\beta < 1$
B) $A\beta > 1$
C) $A\beta = 1$ and total phase shift = 0 or 360°
D) Phase shift = 180°

✅ **Answer:** C)

4. Which oscillator uses a frequency-selective bridge network?

A) Hartley oscillator
B) Colpitts oscillator

C) Wien bridge oscillator
D) RC phase shift oscillator

✅ **Answer:** C) Wien bridge oscillator

5. In an RC phase shift oscillator using three RC sections, each section provides a phase shift of:

A) 30°
B) 45°
C) 60°
D) 90°

✅ **Answer:** C) 60°

6. The frequency of oscillation of a Hartley oscillator depends on:

A) Resistance only
B) Capacitance only
C) Inductance and capacitance
D) Resistance and inductance

✅ **Answer:** C) Inductance and capacitance

7. Which oscillator is best suited for audio frequency generation?

A) Hartley oscillator
B) Colpitts oscillator
C) Wien bridge oscillator
D) Crystal oscillator

✅ **Answer:** C) Wien bridge oscillator

8. Negative feedback in an amplifier causes the bandwidth to:

A) Decrease
B) Increase
C) Remain unchanged
D) Become zero

✅ **Answer:** B) Increase

9. The quality factor (Q) of an oscillator is a measure of:

A) Power loss
B) Frequency stability
C) Gain
D) Feedback factor

☑️ **Answer:** B) Frequency stability

10. Crystal oscillators are preferred because they have:

A) High gain
B) Low power
C) Poor stability
D) Very high frequency stability

☑️ **Answer:** D) Very high frequency stability

11. In AM, the carrier frequency is:

A) Changed
B) Suppressed
C) Kept constant
D) Eliminated

☑️ **Answer:** C) Kept constant

12. Which modulation has the highest noise immunity?

A) AM
B) FM
C) PM
D) DSB-FC

☑️ **Answer:** B) FM

13. The modulation index of an AM signal can have a maximum value of:

A) 0.5
B) 1
C) 2
D) ∞

☑️ **Answer:** B) 1

14. The bandwidth of an FM signal is given approximately by:

A) 2fm2f_m2fm
B) fmf_mfm
C) 2(Δf+fm)2(\Delta f + f_m)2(Δf+fm)
D) Δf−fm\Delta f - f_mΔf−fm

☑ **Answer:** C) 2(Δf+fm)2(\Delta f + f_m)2(Δf+fm)
(Carson's rule)

15. In phase modulation, the phase deviation is proportional to:

A) Integral of modulating signal
B) Amplitude of modulating signal
C) Frequency of carrier
D) Noise voltage

☑ **Answer:** B) Amplitude of modulating signal

16. The envelope detector is used for demodulation of:

A) FM
B) PM
C) AM
D) PCM

☑ **Answer:** C) AM

17. Which circuit is used to detect FM signals?

A) Envelope detector
B) Product detector
C) Foster–Seeley discriminator
D) Balanced modulator

☑ **Answer:** C) Foster–Seeley discriminator

18. In suppressed-carrier AM, the transmitted power is:

A) Maximum
B) Minimum
C) Zero
D) Independent of modulation index

☑ **Answer:** B) Minimum

19. Which modulation system requires the largest bandwidth?

A) AM
B) FM
C) PM
D) DSB-LC

✅ **Answer:** B) FM

20. Phase modulation differs from frequency modulation because:

A) Carrier amplitude changes
B) Phase deviation depends on modulating signal amplitude
C) Frequency deviation is constant
D) No carrier is used

✅ **Answer:** B)

III. DESCRIPTIVE QUESTIONS

1. Explain in detail about working of Hartley and colpitts oscillators with circuits diagrams
2. Discuss about the working of Astable multi vibrator
3. Explain phase modulation and compare FM and PM
4. Explain in detail about working of phase shift and Weinbridge oscillators
5. Discuss about working of Schmitt trigger with net circuit diagram