Pretest Module 16 Unit 2

1. Which component replaced the vacuum tube and was one of the first solid-state devices developed? Transistor

2. How many layers of semiconductor material make up a BJT? (Bipolar-junction transistor) Three

3. What are the two types of BJT? NPN and PNP

4. What device, connected back to back, resembles a BJT? Diode

5. What are the three leads on a transistor? 1. Base (Separating center section) 2. Collector (One outer lead) 3. Emitter (Other outer lead)

6. Which part of a transistor is identified with an arrow? Emitter Arrow points from P type material to N type material like a diode

7. What is the main difference between the PNP and NPN transistors? Polarity of connections

8. What determines the case size and style of a transistor? Current/voltage ratings

9. What is the main difference between power and signal transistors? 1. Signal transistor-Milliwatt range and small case style 2. Power transistor – Up to 100 W and quite often have heat sinks to help dissipate heat

10. What is the purpose of a “heat sink”? Dissipate heat from the component

11. What is the function of an amplifier? Control a large current with a very small current

12. What electrical device operates similar to a transistor? Relay

13. What are some of the advantages of a transistor over a relay? No moving parts, contacts to pit, or coil to burn out

14. How is the collector current controlled in a simple transistor amplifier? By the base current

15. Which two transistor currents must add up to equal the third current? Base and collector add up to the emitter

16. What term is used to describe a very low or non-existent base current in a transistor? Cut off
17. How is a PNP transistor connected different from an NPN transistor? Polarity must be different to operate.

18. What is “biasing” a transistor? Setting the value of $V_{CE}$ for a transistor anywhere from the supply voltage (cut off) to 0 (saturated).

19. What is the voltage $V_{CE}$ when a transistor is saturated? 0

20. What is the voltage $V_{CE}$ when a transistor is cut off? Supply voltage

21. What is the voltage $V_{BE}$ when the base supply voltage is 16V in a transistor? .7 V

22. What is the voltage $V_{RB}$ when the base supply voltage is 16V in a transistor? 15.3 V

23. What is the base circuit current in the previous question if $R_B=2250$ ohms? 6.8 mA

24. What is the collector circuit current in the previous question if Beta=200? 1.36 A

25. What is the value of the emitter current in the previous questions? 1.3668

26. Which value in a transistor must be changed to control the collector current? $R_B$

27. What is the result of reducing the resistance $R_B$ below the point of saturation in a transistor? No more collector current will flow but heating will occur in the base emitter junction.

28. What wattage value is considered a “power” transistor? More than 1 W

29. What are the two positions of the transistor switch? Off or fully on (Saturated)

30. What are two advantages of transistor switching compared to mechanical switching? No moving parts and rapid switching

31. What is the main advantage of a two-transistor circuit? More gain

32. What is “cascading” with transistors? Connecting so one runs into the next and increases gain

33. What is the formula for amplifier gain? Load current/Control current

34. How is an amplifier biased? Selecting the proper base and collector resistance

35. What is the description of a Class A and Class B power amplifier? A. Single transistor biased approximately mid value B. Two transistors alternately
conducting depending on input-signal polarity. Biased at or near their cut-off value

36. What is the main advantage of the darlington-pair transistor? Very large beta

37. What is the typical beta for a darlington-pair transistor? Typically larger than 2500

38. What is a phototransistor? Light sensitive device similar to a photo diode

39. What is the result of increased light falling on the collector-base region of a phototransistor? Ohmic value decreases and base current starts to flow

40. What is the gain of the photo-darlington transistor? Up to 10,000

41. What is a field-effect transistor (FET)? Similar to a BJT but is unipolar and voltage sensitive

42. What are the two types of FETs? JFET and MOSFET

43. Which FET has a fourth lead and an oxide layer? MOSFET

44. What precautions should be taken when working with MOSFETS? Precautions to prevent static charge damage