***Physical Geology, 16e* (Plummer)**

**Chapter 1 Introducing Geology, the Essentials of Plate Tectonics,**

**and Other Important Concepts**

1) We depend on geologists for the raw materials we need for survival.

2) Most deaths associated with volcanic eruptions are due to burns of lava flows.

3) A tsunami has a small wave height, travels rapidly, and is not noticed by people in boats.

4) While the reserves of petroleum hydrocarbons within the United States are limited, other geologic resources (iron, aluminum, copper, and tin) are available in great abundance.

5) Geology uses the scientific method to explain natural aspects of the Earth.

6) Deeply buried rock that is hot and under pressure can deform like taffy or putty.

7) Ocean-ocean plate convergence formed major mountain belts such as the Andes and Cascades.

8) The mantle is the most voluminous of Earth's three major concentric zones.

9) Earth's lithosphere is made up of the uppermost part of the mantle and crust.

10) Understanding geology can help us lessen or prevent damage to the environment.

11) Most convergent plate boundaries coincide with the crests of submarine mountain ranges called mid-oceanic ridges.

12) Plate tectonics regards the lithosphere as divided into segments (plates) that are in horizontal motion.

13) A transform plate boundary occurs where two plates converge.

14) Convergent boundaries, due to their geometry, are the sites of the largest earthquakes on Earth.

15) After the opening of the North Slope in Alaska, the U.S. stopped importing petroleum.

16) The North American Plate is all on one plate.

17) Rocks formed at high temperatures and under high pressure deep within the Earth and pushed upward by tectonic force are stable in their new environment.

18) Rocks brought to the earth's surface by internal processes are worn down, and eroded by surficial processes.

19) The Earth is about 4.6 billion years old.

20) The Earth can be considered as interrelated systems or spheres.

21) The Earth's system that includes the oceans, rivers, lakes, and glaciers of the world is called the \_\_\_\_\_\_\_\_.

A) biosphere

B) hydrosphere

C) atmosphere

D) geosphere

E) solid Earth

22) The \_\_\_\_\_\_\_\_ and the Alpine Fault of New Zealand are examples of transform plate boundaries.

A) New Madrid Fault of Arkansas

B) Choctaw Fault of Oklahoma

C) San Andreas Fault of California

D) East African Rift

E) Rio Grande Rift

23) A \_\_\_\_\_\_\_\_ is a huge ocean wave usually caused by a displacement of the sea floor and commonly associated with massive earthquakes.

A) S-wave

B) tidal wave

C) tsunami

D) seiche

E) breaker

24) A \_\_\_\_\_\_\_\_ is a hot, turbulent mixture of expanding gases and volcanic ash that flows rapidly down the side of a volcano.

A) pyroclastic cloud

B) mud flow

C) lava flow

D) pyroclastic flow

E) hyaloclastic flow

25) Eruptive activity at the summit of the Nevada del Ruiz volcano in Colombia in 1985 caused snow and ice to melt, generating a \_\_\_\_\_\_\_\_ that killed 23,000 people in the village of Armero.

A) gas cloud

B) mud flow

C) lava flow

D) pyroclastic flow

E) hyaloclastic flow

26) To understand geology, one must understand how the solid Earth interacts with water, air, and living organisms. For this reason, it is useful to think of Earth as being part of a \_\_\_\_\_\_\_\_.

A) hydrosphere

B) system

C) trend

D) group

E) formation

27) Among other things, geologists are employed as \_\_\_\_\_\_\_\_.

A) petroleum geologists

B) environmental geologists

C) marine geologists

D) hydrogeologists

E) All of the answers are correct.

28) Rock deep within the Earth is \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_.

A) hot; heat flows inward toward Earth's center.

B) cool; heat flows in toward Earth's center

C) hot; heat flows out toward Earth's surface

D) the same temperature throughout the earth; heat flow is not an important consideration

E) unknown; we can only guess about conditions there

29) Earth's external heat engine is driven by \_\_\_\_\_\_\_\_.

A) solar power

B) residual cosmic radiation from the Big Bang

C) the decay of radioactive isotopes

D) tides

E) meteor impacts

30) \_\_\_\_\_\_\_\_ refer(s) to the scientific study of Earth.

A) Hydrology

B) Geology

C) Spheres

31) The Earth's interior heat engine works because hot buoyant material deep within the Earth \_\_\_\_\_\_\_\_ while cold denser material \_\_\_\_\_\_\_\_.

A) moves upward; moves downward

B) contracts and sinks; expands and rises

C) contracts and rises; expands and sinks

D) expands and sinks; contracts and rises

32) The \_\_\_\_\_\_\_\_ is the most voluminous of the Earth's three major concentric zones.

A) core

B) mantle

C) lithosphere

D) asthenosphere

E) crust

33) Listed from Earth's center outward, the three concentric zones of Earth are the \_\_\_\_\_\_\_\_.

A) crust, mantle, core

B) mantle, crust, core

C) core, crust, mantle

D) mantle, core, crust

E) core, mantle, crust

34) A \_\_\_\_\_\_\_\_ is a scientific concept that has been tested and is in all likelihood true.

A) concept

B) hypothesis

C) theory

D) scenario

E) belief

35) \_\_\_\_\_\_\_\_ are geological forces generated inside the Earth.

A) Surficial forces

B) Electrochemical forces

C) Tectonic forces

D) Inertial forces

E) Celestial forces

36) Earthquakes, volcanic eruptions, landslides, floods, and tsunamis are all examples of:

A) earth-altering processes.

B) earth hazards.

C) geologic resources.

D) geospheric processes.

E) geologic hazards.

37) The \_\_\_\_\_\_\_\_ collectively make up the lithosphere.

A) crust and the whole mantle

B) crust and the uppermost part of the mantle

C) crust and the asthenosphere

D) upper and the lower mantle

E) asthenosphere and the upper mantle

38) The \_\_\_\_\_\_\_\_ is soft and therefore flows more readily than the underlying mantle.

A) crust

B) asthenosphere

C) lithosphere

D) core

E) plate

39) A hypothesis that passes repeated tests ultimately becomes \_\_\_\_\_\_\_\_.

A) a guess

B) an observation of a phenomenon

C) a first, tentative idea to explain a phenomenon

D) a theory

E) a proven law of nature

40) After data have been analyzed, tentative explanations or solutions called \_\_\_\_\_\_\_\_ may be proposed.

A) a guess

B) an observation of a phenomenon

C) hypotheses

D) a concept that has been tested reproducibly and is likely to be true

E) a proven law of nature

41) Plate tectonics is a unifying idea that helps explain where and why there are \_\_\_\_\_\_\_\_ on Earth.

A) earthquakes

B) volcanoes

C) mountain belts

D) oceanic ridges and trenches

E) All of the answers are correct.

42) The two major types of crust are oceanic crust and \_\_\_\_\_\_\_\_.

A) continental crust

B) lithosphere

C) convergent crust

D) thin crust

43) Earth can be visualized as a giant machine driven by which of the following engines?

A) solar and internal

B) regional and local

C) expanding and condensing

D) surficial and heat

E) buried and exposed

44) The concept of plate tectonics regards the Earth's \_\_\_\_\_\_\_\_ as broken into a number of \_\_\_\_\_\_\_\_ that are in motion relative to each other.

A) crust; plates

B) mantle; plates

C) asthenosphere; plates

D) lithosphere; plates

E) plates; lithosphere

45) A \_\_\_\_\_\_\_\_, by scientists' definition, is something that has been overwhelmingly verified.

A) hypothesis

B) guess

C) prediction

D) theory

46) Plates are known to be moving away from each other \_\_\_\_\_\_\_\_.

A) across mountain ranges like the Himalayan Mountains

B) across subduction zones

C) across mid-ocean ridges

D) across the stable interior of continents

E) along transform faults

47) A(n) \_\_\_\_\_\_\_\_ boundary occurs where plates move towards one another.

A) convergent

B) concurrent

C) rift

D) abutting

E) transform

48) The \_\_\_\_\_\_\_\_ of old seafloor takes place at convergent boundaries.

A) destruction

B) creation

C) production

D) erosion

E) extinction

49) The North American plate is moving \_\_\_\_\_\_\_\_.

A) north

B) south

C) west

D) east

E) nowhere, it's fixed

50) Where a subducting plate slides beneath the lithosphere, melting takes place and a(n) \_\_\_\_\_\_\_\_ is created.

A) plate

B) ocean trench

C) seamount

D) sedimentary rock

E) coral reef

51) Sedimentary rock that becomes deeply buried may be transformed by heat and pressure into \_\_\_\_\_\_\_\_ rock.

A) soil

B) igneous

C) granite

D) metamorphic

E) All of the answers are correct.

52) The product of the breakdown of surface rocks by weathering and erosion is \_\_\_\_\_\_\_\_.

A) lava

B) magma

C) sediment

D) quartz

E) ash

53) With the cementation of loose particles sediment becomes \_\_\_\_\_\_\_\_.

A) molten

B) metamorphic

C) lithified

D) igneous

E) basalt

54) \_\_\_\_\_\_\_\_ takes place where moving water, ice, and wind loosen and remove material on the continents.

A) Burial

B) Metamorphism

C) Melting

D) Subsidence

E) Erosion

55) Disintegration of rock at Earth's surface may be facilitated by water \_\_\_\_\_\_\_\_.

A) flowing on the surface in streams and as runoff

B) frozen in a glacier that is flowing over the surface

C) moving through near-surface pores and fractures

D) present as vapor in the atmosphere

E) All of the answers are correct.

56) A(n) \_\_\_\_\_\_\_\_ may eventually be formed as layers of sediment are buried by subsequent layers of sediment.

A) igneous rock

B) metamorphic rock

C) sedentary rock

D) sedimentary rock

E) foliated rock

57) The best geologic data currently available indicates that Earth is approximately \_\_\_\_\_\_\_\_ years old.

A) 4,550

B) 4,550,000

C) 4,550,000,000

D) 4,550,000,000,000

E) 4,550,000,000,000,000

58) Which of the following life forms appeared first in the geologic record?

A) dinosaurs

B) mammals

C) plants

D) fishes

E) reptiles

59) Fossil evidence indicates that complex life forms, capable of generating easily fossilized hard parts like shells or bones, have existed in abundance on Earth since approximately \_\_\_\_\_\_\_\_ years ago.

A) 5,440

B) 544 thousand

C) 544 million

D) 5,440,000,000

E) 544,000,000,000

60) Fossil evidence indicates that dinosaurs became extinct approximately \_\_\_\_\_\_\_\_ years ago.

A) 65 thousand

B) 650 thousand

C) 6,500,000

D) 65 million

E) 650,000,000

61) What is the correct order of the geologic eras listed, from oldest to youngest?

A) Cenozoic, Mesozoic, Paleozoic

B) Mesozoic, Paleozoic, Cenozoic

C) Paleozoic, Mesozoic, Cenozoic

D) Cenozoic, Paleozoic, Mesozoic

62) Motion at a transform plate boundary is \_\_\_\_\_\_\_\_.

A) horizontal

B) vertical

C) oblique

63) What type of plate boundary is associated with a rift?

A) convergent

B) divergent

C) transform

D) new

E) old

64) What country experienced a 9.0 earthquake and associated tsunami off its coast in March 2011 yet faired relatively well from such a disaster because of their preparedness?

A) Japan

B) Peru

C) United States

D) New Zealand

E) Haiti

65) A portion of the continental crust may move upward after a period of significant erosion to maintain balance through the process of \_\_\_\_\_\_\_\_.

A) volcanism

B) sedimentation

C) metamorphism

D) isostatic adjustment

E) lithification

66) Rock that forms from solidified magma is \_\_\_\_\_\_\_\_ rock.

A) igneous

B) metamorphic

C) sedimentary

67) Oceanic crust is created at \_\_\_\_\_\_\_\_ and destroyed at \_\_\_\_\_\_\_\_.

A) subduction zones; oceanic ridges

B) oceanic-ridges; subduction zones

C) subduction zones; transform boundaries

D) transform boundaries; subduction zones

E) trenches; rifts

68) Which of the following layers of Earth is a liquid?

A) crust

B) mantle

C) outer core

D) inner core

69) Plate tectonics emerged as a science in the 1960s, and was based on the earlier hypothesis of \_\_\_\_\_\_\_\_.

A) evolution

B) planetesimals

C) electromagnetism

D) continental drift

E) nebular formation

70) Plate tectonics is a result of Earth's internal heat engine, powered by

A) the Sun

B) gravity

C) heat flowing from Earth's interior outward

71) A typical rate of plate motion is

A) 3-4 meters per year

B) 1 kilometer per year

C) 1-10 centimeters per year

D) 1,000 kilometers per year

72) Volcanic island arcs like the islands of Japan are associated with

A) transform boundaries

B) divergent boundaries

C) ocean-continent convergence

D) ocean-ocean convergence

73) The division of geology concerned with Earth materials, changes in the surface and interior of the Earth, and the dynamic forces that cause those changes, is

A) physical geology

B) historical geology

C) geophysics

D) paleontology

74) Which is a geologic hazard?

A) earthquake

B) volcano

C) mudflows

D) floods

E) wave erosion at coastlines

F) landslides

G) All of these choices are correct.

75) The largest zone of Earth's interior, by thickness, is the

A) crust

B) mantle

C) outer core

D) inner core

76) Oceanic and continental crust differ in

A) composition

B) density

C) thickness

D) All of these choices are correct.

77) The forces generated inside Earth that cause deformation of rock as well as vertical and horizontal movement of portions of Earth's crust are called

A) erosional forces

B) gravitational forces

C) tectonic forces

D) all of the preceding

78) Plate tectonics is a

A) conjecture

B) opinion

C) hypothesis

D) theory

79) Which is a type of a plate boundary?

A) divergent

B) transform

C) convergent

D) All of these choices are correct.

80) Erosion is a result of Earth's external heat engine, powered by (choose all that apply)

A) the Sun

B) gravity

C) heat flowing from Earth's interior outward

81) Western economies rely on which of the following?

A) petroleum

B) metals

C) coal

D) uranium

E) natural gas

F) All of these choices are correct.

82) An analogy of the materials of Earth's interior is

A) an egg (thin shell, white, yolk)

B) a balloon (thin stretchable shell and air)

C) a bowling ball (rigid shell and air)

D) a baseball (soft shell and compressible core)