Mansoura University
Faculty of Science
Geology Department
Second Term Exam
17/05/2015

Subject: Geophysics (203) كود المقرر(جف٢٠٣)
Course: Earthquakes & Eq Engineering
المستوى الثانى

Time: 2 hours
Full Mark: 60

هام: الإمتحان على صفحتين

Answer these THREE questions: (20 degrees for each question)

Q1. Complete: (20 degrees; one for each statement)

1. …… is the diffracted P wave.
2. …… is the S wave reflected back to mantle as P from the discontinuity at 400 km depth.
3. …… is S wave traversed the outer and inner core as P, and back again to mantle as P wave.
4. …… is P wave reflected from the Moho as P wave.
5. Earthquake effects include primary effects as… …, secondary as ……, and tertiary ones as … ….
6. For surface waves, …… is the velocity with which a wave with a single frequency propagates.
7. For surface waves, …… is the velocity of travel of the wave train envelope.
8. ……. are a large number of earthquakes take place in the epicentral area following the main shock.
9. The response of the seismometer is proportional to……. when its natural period is equal to that of the ground motion.
10. The amplitude of surface waves is inversely proportional to the …….of the propagated distance.
11. The…. earthquakes occur within the plate itself, while…… earthquakes occur along plate margin.
12. …… is a depth phase that leaves the focus upward as P, is reflected at the free surface and continues further as Pn along Moho.
13. ……is the shear wave traveling along the Conrad discontinuity boundary.
14. The common microseismic noise has periods of about……. sec.
15. tpP-tP is strongly dependent on ……., while tPP-tP is strongly dependent on ……..
16. LQ waves usually show the largest amplitudes on ……. component, and S waves are best displayed on ……. component.
17. When ts-tp is < 25 sec, the first arriving phase is …….
18. ……. is the shear wave traveling within the granitic layer.
19. The short-period S waves multiply reflected between the free surface and Moho interfere with each other and give rise to a wave group labeled …….
20. In order to make the seismometer indicate the ground motion accurately, it is necessary that the rate at which the pendulum returns to its rest position be very ……..

Q2. Put Yes or No and correct the underlined word if it is false: (20 degrees; one for each statement)

1. The Conrad discontinuity occurs at the crust-mantle boundary.
2. The asthenosphere extends between 100 and 250 km depths where rocks are partially molten.
3. Seismic velocities increase in the lower mantle with higher rate than in the upper mantle.
4. It is generally accepted that surface waves cease to exist at the outer core depth due to its fluid character.
5. The deep earthquakes have impulsive surface waves.
6. Due to concentration (focusing) of energy, the seismic waves show a decrease in their amplitude at large distances.
7. The cultural noise has dominant frequencies above six Hz.
8. Different waves are polarized in a different way, so P and Rayleigh are best studied on horizontal seismograms but S and Love on the vertical ones.
9. If the resonant frequency of the seismometer is higher than that of the ground motion, its response is proportional to the displacement of the ground motion.

10. Earthquakes in mid-oceanic ridges are deeper than that in subduction zones.
11. The depth region of low velocity in the ocean (SOFAR) occurs at a depth of about 700-1300ft.
12. Pn is the compressional wave traveling along the Conrad discontinuity.
13. pPn is a depth phase that leaves the focus upward as P, is reflected as S (converted) at the free surface and continues further as Sn along Moho.
14. Amplitudes of direct P-waves highly increase beyond 100°.
15. The distance range 105 to (-105°) is called the shadow zone for P-waves.
16. PKS is stronger on vertical component than SKP.
17. The Moho discontinuity separates the granitic/basaltic rocks within the continental crust.
18. Body waves traveling through layered media often show normal dispersion.
19. S phases are very useful in discriminating nuclear explosions detonated beneath oceanic islands and tectonic earthquakes.
20. Shallow earthquakes are usually characterized by absence of aftershocks.

Q3. Choose inbetween perenthesis: (20 degrees; one for each statement)

1. The converging plate boundary is called....., and the diverging is called ..... (a) passive, (b) constructive, (c) destructive, (d) transform fault
2. Rock fracturing starts from the focus and propagates along the fault plane with velocity of about ..... km/s. (a) 2, (b) 3, (c) 4, (d) 5
3. The slip during large earthquakes can amount several ..... (a) millimeters, (b) centimeters, (c) meters, (d) kilometers
4. The strain energy accumulation is ....., while its release is ..... (a) abrupt, (b) slow, (c) fast
5. .....are natural earthquakes, while ..... are artificial ones. (a) rock falls, (b) microseisms, (c) cultural noise, (d) explosives
6. VP in the mantle increases from .....km/s to .....km/s at the core-mantle boundary. (a) 6, (b) 8, (c) 8.1, (d) 13.7
7. P-waves travel about ..... times faster than S-waves (a) 1.1, (b) 1.3, (c) 1.5, (d) 1.7
8. Cultural noise affects records of ..... events, while microseisms interfere with records of ..... events. (a) regional, (b) near, (c) distant, (d) teleseismic
9. The amplitude of seismic waves can range from few ..... to tens of ..... (a) micrometers, (b) millimeters, (c) centimeters, (d) meters
10. Earthquakes within the oceanic crust will not show ....., and first arrivals will be ..... or ..... (a) Pg, (b) P*, (c) Pn, (d) Pb
11. Seismic waves from local earthquakes of low magnitude are recorded by ..... seismographs. (a) short-period, (b) intermediate-period, (c) long-period, (d) broad-band
12. The direct P reflected twice from the free surface is called..... (a) PP, (b) PPP, (c) pP, (d) pPn
13. ..... is P-wave reflects from the core-mantle boundary. (a) PcP, (b) PmP, (c) PiP, (d) Pc
14. S-waves that traverse the inner core as S are referred as ..... (a) SKIKS (b) SKSKS, (c) SKJKS, (d) PKSKP
15. ..... are PKP waves once reflected from the free surface back to the station in the same hemisphere as the focus. (a) P`P`, (b) PKP1, (c) PKP2, (d) PKPPKP
16. An Airy phase is characterized by ..... frequency compact wave train. (a) decreasing, (b) constant, (c) increasing, (d) variable
17. The instrument which measures the amount of ground motion is called a ..... (a) seismoscope, (b) seismograph, (c) seismometer, (d) accelerometer
18. If the seismometer natural period greatly exceeds the ground motion, its response is proportional to the ..... of the ground. (a) acceleration, (b) velocity, (c) displacement, (d) time
19. Precursory phenomena in the epicentral area of the predicted large earthquake include variation in..... (a) radon gaz emission, (b) VP/Vs ratio, (c) electrical resistivity, (d) microearthquakes
20. In the seismic cycle, the preseismic phase corresponds to the period of ....., and the coseismic phase to the period of ..... (a) foreshocks, (b) aftershocks, (c) mainshock, (d) swarms

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Final Exam Second Semester ; 2015

Time : Two hours | **Educational Year : level two**

Date : 20/5/ 2015 | **Subjects : Radioactivity**

Mark: 60 Mark | **Course Code : phys.230**

Answer the Following Questions:-

1-(a) Complete the following decay processes by adding the missing decay particles $(\alpha, \beta, \gamma, \nu)$,and write the name of the process . **[10 Marks]**

1) ${}^{14}_{6}C \rightarrow {}^{14}_{7}N + ? + ?$

2) ${}^{7}_{4}Be + ? \rightarrow {}^{7}_{3}Li + \nu$

3) ${}^{12}_{6}C^{*} \rightarrow {}^{12}_{6}C + ?$

4) ${}^{238}_{92}U \rightarrow {}^{234}_{90}Th + ?$

5) ${}^{12}_{7}N \rightarrow {}^{12}_{6}C + ? + ?$

(b) A sample of the isotope ^{113}I, which has a half-life of 8.04 days, has a measured activity of 5mCi at the time of shipment. Upon receipt in a medical laboratory, the activity is measured to be 4.2 mCi . how much time has elapsed between the two measurements? **[5 Marks]**

(c) Describe the G.M Counter. **[5 Marks]**

2-(a) A parent radioactive element undergoes successive disintegration, find the number of daughter nuclei after time t. **[10 Marks]**

(b) Three different rock samples have ratios of numbers of ${}^{238}_{92}U$ *atoms* to ${}^{206}_{82}Pb$ atoms of 0.5 , 1.0 , and 2.0 . compute the ages of of three rocks(half life for ${}^{238}_{92}U$ is 4.47 x10^{9} year) . **[5 Marks]**

(c) Describe the mechanism of alpha decay. **[5 Marks]**

3--(a) Write short notes on:- natural radioactivity **[5Marks]**

(b) Explain the binding energy per nucleon curve. **[5Marks]**

4-(a) Write the type of the interaction of charged particles with mater ? **[5Marks]**

(b) How far 2.75 MeV alpha particles in air and ${}^{210}_{82}Pb$? **[5Marks]**

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Final Exam: May, 2015
Course: Electrical Prospecting Methods: GF-204
Time: 2 hours

Answer the following questions:

Q1:

A- Complete: (8 Marks)

i- Electromagnetic methods are divided into .....,.....

ii- As the conductivity decreases skin depth .....

iii- Semi conduction occurs in ..... such as..... and the charge carriers are ....., ...

iv- Resistivity in brines ..... as the total dissolved solids (TDS) decrease.

B- Choose the correct answer: (4 Marks)

For three layers resistivities in two interface case, four possible curve types exist:

i- $\rho1 > \rho2 > \rho3$ (H-Q-A-K type)

ii- $\rho1 > \rho2 < \rho3$ (H-Q-A-K type)

iii- $\rho1 < \rho2 > \rho3$ (H-Q-A-K type)

iv- $\rho1 < \rho2 < \rho3$ (H-Q-A-K type)

Q2:

A- Deduce the wave equation in time and frequency domain electromagnetic method (8 Marks)

B- Define the following: Archie equation - Cagniard impedance? (8 Marks)

Q3:

A- Describe three of the parameters measured in induced polarization method? (8 Marks)

B- Mention the main applications of self potential method? (8 Marks)

Q4:

A- Explain the Basic principles of TEM method (8 Marks)

B- Illustrate how is the resistivity (ρ) related to the number of charge carrier? (8 Marks)

Best Wishes:

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