



FACULTY	AGRICULTURE, ENGINEERING AND NATURAL SCIENCES		
SCHOOL	SCHOOL OF SCIENCES		
DEPARTMENT	ENVIRONMENTAL SCIENCE		
SUBJECT	FUNDAMENTALS OF PHYSICAL GEOGRAPHY		
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DURATION	3 HOURS	MARKS	100

JUNE SUPPLEMENTARY EXAMINATION

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INSTRUCTIONS

1. Work in an orderly manner and present your work as neatly as possible.
2. While most of the marks will be awarded for content, candidates must bear in mind the importance of presentation, i.e. insight and critical thinking.
3. Number your questions correctly and clearly.
4. This paper consists of four (4) pages (excluding this front page).
5. Answer all the questions.
6. The use of calculator is allowed.

QUESTION 1**[22 marks]**

Read very carefully each statement below and indicate whether each of the following statements is *True* or *False* (Please write down the entire word).

- (a) Scientific knowledge can only be truthful if there is empirical evidence to support it.
- (b) The distance across the edges of the universe was only discovered recently, thanks to advances in space technology.
- (c) The irony of science and knowledge is that the more you know, the more you become uncertain.
- (d) In the southern hemisphere, the south facing slope is often more productive from a vegetative perspective because it receives more insolation as opposed to the north facing slope.
- (e) Because of the finite speed of light, when you gaze up into the night sky, you are looking into the past.
- (f) On a relative scale a planet is smaller than a galaxy, but larger than a star in our universe.
- (g) After the 21st March each year, the Sun subpolar point starts shifting northward to the Tropic of Capricorn.
- (h) Radiation with longwave length has higher frequency and therefore more energy.
- (i) The far side of the moon is not visible from earth because the moon's revolution around the earth is synchronised with its rotation on its own axis.
- (j) When crossing the international dateline, it is possible to move back in time, say from Monday back to Sunday.
- (k) Equinox occurs two times every year, on the 21st December and 21st June.
- (l) Two geographical positions along different longitude locations, but same latitude locations will experience the same earth rotational velocity.
- (m) All planets revolve around the Sun in a counter clockwise direction, except Venus and Uranus.
- (n) Mercury is the hottest planet in our solar system because it is the closest to the Sun.
- (o) The earth is divided into 24 time zones, with each zone equivalent to a distance (km) the earth rotate on its axis per hour.
- (p) If the moon was half a million km away from the Earth, it will take approximately 1.6 seconds for a particle of light to travel between these two celestial bodies.
- (q) The term geothermal gradient refers to a gradual increase in temperature from earth surface to the centre of the earth.
- (r) Earth is the only celestial body with water in our solar system.
- (s) Windhoek the capital City of Namibia experience solar radiation at Zenith point twice per year.
- (t) Summer occurs during perihelion when the earth is closer to the sun, whereas, winter occurs during aphelion when the earth is located at its farthest point away from the sun.
- (u) If the Earth reduces its rotational velocity by half, days will become longer, while nights will become shorter in Namibia.
- (v) All planets orbit along nearly the same flat-disc shaped orbital plane around the Sun.

QUESTION 2**[15 Marks]**

Choose the correct answer from each of the following (one mark for each question):

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| <p>2.1 Which of the following statements best describe the earth and its spheres?</p> <p>a) The earth is a closed system made up of three (3) closed abiotic spheres and one (1) closed biotic sphere.</p> <p>b) The earth is an open system made up of three (3) closed biotic spheres and one (1) open abiotic sphere.</p> <p>c) The earth is a closed system made up of three (3) open abiotic spheres and one (1) open biotic sphere.</p> <p>d) The earth is an open system made up of three (3) open abiotic spheres, and one (1) closed biotic sphere.</p> <p>e) None of the above</p> <p>2.2 The uniqueness of scientific knowledge rest in the following character:</p> <p>a) It is acquired based on habit, conviction and faith.</p> <p>b) It is always truthful.</p> <p>c) It is peer reviewed.</p> <p>d) It is superior to pre-scientific knowledge.</p> <p>e) None of the above.</p> <p>2.3 Light from the Sun takes _____ to reach the Earth.</p> <p>(a) virtually no time</p> <p>(b) 8.3 seconds</p> <p>(c) 83 seconds</p> <p>(d) 8.3 minutes</p> <p>(e) 83 minutes</p> <p>2.8 If it is 2 P.M. Greenwich, UK (UTC), and it is 8 P.M. where you are, at what longitude must you be?</p> <p>a) 60°E</p> <p>b) 90°E</p> <p>c) 90°W</p> <p>d) 60°W</p> <p>e) 30°W</p> <p>f) 30°E</p> <p>2.9 The distance between meridians is greatest</p> <p>a) At the poles.</p> <p>b) At the Arctic/Antarctic circles.</p> <p>c) At the Tropics of Cancer/Capricorn.</p> <p>d) At the Equator.</p> <p>e) everywhere, since they are parallel to each other.</p> | <p>2.4 Which of the following is classified as an igneous rock?</p> <p>a) sandstone</p> <p>b) gneiss</p> <p>c) basalt</p> <p>d) shale</p> <p>e) schist</p> <p>2.5 According to their percentage by weight, what are the two main elements in the Earth's crust?</p> <p>(a) iron and calcium</p> <p>(b) oxygen and silicon</p> <p>(c) potassium and magnesium</p> <p>(d) iron and calcium</p> <p>(e) None of the above</p> <p>2.6 Solar energy propagates (travels) in space to Earth in the form of:</p> <p>(a) Convection</p> <p>(b) Conduction</p> <p>(c) Radiation</p> <p>(d) All of the above</p> <p>(e) A and B above</p> <p>2.7 Magma cools to form:</p> <p>(a) Metamorphic rock</p> <p>(b) Igneous rocks</p> <p>(c) Sedimentary rocks</p> <p>(d) All of the above</p> <p>(e) None of the above</p> <p>2.11 Which of the following statements is correct with regards to our solar system.</p> <p>(a) All terrestrial planets spin clockwise on their axis, except Venus.</p> <p>(b) The closest planet to the Sun is the hottest planet in our solar system.</p> <p>(c) Terrestrial planets are less dense as compared to Jovian planets.</p> <p>(d) All of the above.</p> <p>2.12 The following statements describes the nature of the electromagnetic spectrum. Indicate the statement which is incorrect.</p> <p>(a) The longer the wavelength, the high the frequency, and the less the energy.</p> <p>(b) The shorter the wavelength, the lower the frequency, the more the energy.</p> |
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<p>2.10 Which of the following is correct about the following location: 38.9167 °: -77.00 °?</p> <p>(a) It is located in South Western hemisphere. (b) It is located in the north western hemisphere Hemisphere. (c) It is located in the South Western hemisphere. (d) It is located in the South Eastern hemisphere. (e) None of the above.</p> <p>2.13 Which one of the following Cities experience solar radiation at Zenith/sun-solar point twice per year.</p> <p>(a) Cape Town. (b) Windhoek. (c) London. (d) New York. (e) None of the above.</p> <p>2.15 Which of the following processes is not associated with the formation of sedimentary rocks?</p> <p>(a) Deposition (b) Erosion (c) Lithification (d) Eruption (e) All of the above</p>	<p>(c) Radiation with longer wavelength has less energy and therefore are not able to penetrate the earth atmosphere. (d) The shorter the wavelength, the higher the frequency, the more the energy. (e) None of the above.</p> <p>2.14 The Earth's lower mantle is mainly composed of:</p> <p>(a) Solid iron and nickel (b) Liquid iron and magnesium (c) Liquid nickel, silicon and iron (d) Solid iron oxide, magnesium and silicon (e) None of the above</p>
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QUESTION 3

[20 marks]

For each of the statements in Table 1, match it with an appropriate explanatory/descriptive term from Table 2 below:

[1 marks each]

Table 1. List of Geographical terms

Basic research	0°	Uranus	Applied Research	Atmosphere
Geomorphology	Tradition		Atmosphere	
23.5° S	Tectonic stresses	Aphelion		Perihelion
Neptune	25°C/km		Gamma rays	Diverging plate boundary
Sub-tropical	Counter clockwise	Lithosphere	Tectonic uplift	10 km
5 km	Fluvial erosion	Pleistocene	22 September 2022	Mid-latitude
21 June 2022	Aluminium	Clockwise		
Oceanic crust	Infrared	Silicon	6.4 °C/km	Continental crust
Sandstone	Petrified wood	Solar energy	Holocene	Converging plate boundary

Table 2. List of explanatory statements.

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| <p>(a) The earth's sphere that includes an edaphosphere.</p> <p>(b) A term referring to the point when the Earth is closest to the Sun.</p> <p>(c) The upper altitudinal limit of human dwelling in the biosphere.</p> <p>(d) The direction in which oceanic and atmospheric circulations are deflected in the southern hemisphere.</p> <p>(e) A latitude zone.</p> <p>(f) The rate at which temperature decreases with depth in the earth interior.</p> <p>(g) A term referring to the point when the Earth is at its furthest point from the Sun.</p> <p>(h) The date when the Sun declination is 23.5° N.</p> <p>(i) The latitude zone located between 25° N and 35° N.</p> <p>(j) The direction in which oceanic and atmospheric circulations are deflected in the northern hemisphere.</p> <p>(k) The rate at which temperature decrease with altitude in the earth atmosphere.</p> <p>(l) The calendar date when a day last for 12 hours of daylight on earth.</p> <p>(m) An example of a shortwave radiation.</p> <p>(n) An earth crust largely made up of fine grained particles (basalt).</p> <p>(o) The second most abundant element in the earth crust.</p> <p>(p) An example of an exogenic process on the geological cycle.</p> <p>(q) An example of an Organic rock.</p> <p>(r) A source of energy for metamorphic rocks to form.</p> <p>(s) A name of the first epoch during the Quaternary period.</p> <p>(t) A constrictive plate boundary.</p> |
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QUESTION 4**[15 marks]**

Supposed you arrived in Swakopmund (22.64° S: 14.60° E) for vacation on the 22nd December 2022, after completing your end year examination at UNAM. Answer the following questions.

- a) What is the difference between the term Sun declination and Sun altitude? (3)
- b) What will be the noon Sun altitude in Swakopmund on the day given above? (4)
- c) Workout the latitude where the noon Sun altitude will be 2° degree above the horizon on that day?(4)
- d) Suppose the noon Sun altitude along equator is 86° degrees on a certain unspecified day. Workout the latitude of the sub-solar point sun on that unspecified day. (4)

QUESTION 5**[10 marks]**

- (a) Explain the relationship between earth rotation and the distribution of cold and warm currents in the Southern hemisphere. (5)
- (b) Explain why the Earth does not receive a uniform amount of insolation across all its surface. (5)

QUESTION 6**[10 marks]**

Distinguish between igneous rocks, sedimentary rocks and metamorphic rocks, and shed some light on processes that are involved in their formations. (10)

QUESTION 7**[8 marks]**

Suppose you are teaching school learners about "Pangaea" a supercontinent that once existed. Use Alfred Wegener's theory of continental drift to advance your arguments about Pangaea then and now. (8)

END OF EXAMINATION