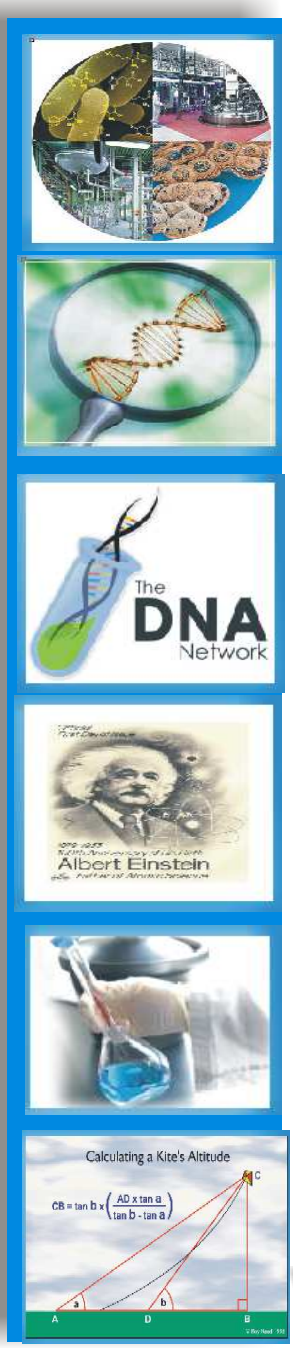

GATE - GG & GP

MOCK TEST PAPER

- There are total of 65 questions in this paper which are of multiple choice type or numerical answer type.
- Part-A is a compulsory section that contains 25 questions and Part-B contains two optional sections : Section 1 (Geology) and Section 2 (Geophysics). Each of these sections contains 30 questions.
- Questions Q.1 - Q.25 carry 1 mark each. Questions Q.26 -Q.55 carry 2 marks each. The 2 marks questions include two pairs of common data questions and two pairs of linked answer questions depends on the answer to the first question of the pair. If the first question in the linked pair is wrongly answered or is not attempted, then the answer to the second question in the pair will not be evaluated.
- Questions Q. 56 - Q.65 belong to General Aptitude (GA) section and carry a total of 15 marks. Questions Q.56 - Q.60 carry 1 mark each, and questions Q. 61 - Q.65 carry 2 marks each.
- There will be negative marking of 1/3 marks for each wrong answer for 1 mark questions. For all 2 marks questions 2/3 marks will be deducted for each wrong answer. However, in the case of the linked answer question pair, there will be negative marks only for wrong answer to the first question and no negative marks for wrong answer to the second question. There is no negative marking for questions of numerical answer type.

TIME : 3 HOURS

MAX. MARKS : 100

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PART A : COMMON TO BOTH GEOLOGY AND GEOPHYSICS CANDIDATES

1. Match the following and choose the correct answer:

Theory	**Propounder**
A. Big-Bang Theory	1. Dr. Allan Sandage
B. Pulsating Universe Theory	2. AbbGeorges Lemaitre
C. Steady State Theory	3. Buffen
D. Dynamic Encounter Theory	4. Thomas Gold and Herman Bondi

(A) A – 1 B – 2 C – 3 D – 4

(B) A – 1 B – 2 C – 4 D – 3

(C) A – 2 B – 1 C – 4 D – 3

(D) A – 2 B – 1 C – 3 D – 4

2. The time taken for light from the sun to reach the earth is _____secs.

3. Hawaiin volcanism belongs to which one of the following types :

(A) MOR volcanism

(B) Island arc volcanism

(C) Geosynclinal volcanism

(D) Intraplate volcanism

4. The layers of rock having intermediate P wave velocities between 7.2 – 7.7 km/sec are characteristic of :

(A) Shield Areas

(B) Ocean Basins

(C) Precambrian Orogenic terrains

(D) Continental Margins

5. Match the following and choose the correct answer from the choices given below :

A. Mindanao Deep	1. Indian Ocean
B. Planet Deep	2. Atlantic Ocean
C. Milwaukee Deep	3. Pacific Ocean

D. Nares Deep

(A) A – 3 B – 2 C – 2 D – 1

(B) A – 2 B – 2 C – 3 D – 1

(C) A – 3 B – 1 C – 2 D – 2

(D) A – 2 B – 1 C – 3 D – 3

6. Lapilli are the pyroclastic materials having the size range _____mm.

7. The aluminium content of sedimentary rocks is usually very high because

I. Aluminium is one of the most insoluble elements and does not readily go into solution

II. Much of the aluminium is taken up by the clay minerals to form clay-rich rocks

III. Formation of residual deposits leads to the concentration of aluminium in sedimentary rocks

(A) I and II are correct

(B) I and III are correct

(C) II and III are correct

(D) All of the above are correct

8. The mantle ---------- % of the earth by volume.

9. The data of the rocks of the oceanic crust is not older than

(A) Permian

(B) Triassic

(C) Jurrasic

(D) Cretaceous

10. Which of the following statements is not derived from pratt's hypothesis of isostacy.

(A) Compensation takes place by lateral density variations of the crust.

(B) The thickness of the crust varies by the top and the bottom.

(C) Lithosphere is synonymous with the crust

(D) Mountains are underlain by anomalously low density materials .

11. Transform faults boundaries are characterised by

(A) Shallow focus earthquakes of depths less than 15 km.

(B) Shallow focus earthquakes of depths less than 100 km

(C) Deep focus earthquakes

(D) Absence of earthquakes

12. Compared to felsic igneous rocks, mafic igneous rocks contain greater amounts of

(A) White quartz

(B) Aluminum

(C) Pink feldspar

(D) Iron

13. Which mineral is white or colorless, has a hardness of 2.5, and splits with cubic cleavage?

(A) Calcite

(B) Halite

(C) Pyrite

(D) Mica

14. The lines joining the points of equal thickness of a particular stratigraphic units are known as:

(A) Isobars.

(B) Isobaths.

(C) Isohyets.

(D) Isopaches.

15. Sediments derived from the erosion of a land area, outside the basin of deposition and carried into the basin, such solid materials are – – – in nature

(A) Orthochemical

(B) Hybrid

(C) Terrigenous

(D) Pyroclastic

16. Which metal is the most mobile, from the dispersion of ions in relation to ore deposits?

(A) Copper.

(B) Leaf

(C) Zirconium.

(D) Silver

17. Which of these is a sedimentary rock?

(A) Granite

(B) Gneiss

(C) Sandstone

(D) None of these

18. Which of the following correctly lists electromagnetic waves in order from longest to shortest wavelength?

(A) Gamma rays, ultraviolet, infrared, microwaves

(B) Microwaves, ultraviolet, visible light, gamma rays

(C) Radio waves, infrared, gamma rays, ultraviolet

(D) Television, infrared, visible light, X-rays

19. Geochemical prospecting is concerned primarily with the examination of the

(A) Rocks and waters.

(B) Waters and gases.

(C) Rocks only.

(D) Rocks, waters and gases.

20. The Granulite facies is characterised by:

(A) The presence of micas

(B) The absence of micas

(C) The absence of orthoclase

(D) The absence of quartz

21. Which of the following energy sources produces the most electricity in the United States?

(A) Coal

(B) Hydropower

(C) Natural gas

(D) Uranium (nuclear power)

22. Which of the following is a renewable source of energy?

(A) Coal

(B) Hydropower

(C) Natural gas

(D) Petroleum

23. An igneous rock consisting of the minerals orthoclase (potassium feldspar), quartz, muscovite (mica), hornblende (amphibole), biotite (mica) and plagioclase (in that order or relative abundance) is likely, upon significant physical and chemical weathering, to produce sediment containing:

(A) Clay minerals, quartz and muscovite

(B) Clay minerals, hornblende and iron oxide/hydroxide minerals

(C) Quartz, clay and ferromagnesian minerals

(D) Plagioclase, orthoclase and clay minerals

24. A commercial oil reservoir has recently been discovered. If water influx is present but ignored in early material balance calculations of original oil in place, the calculated value for OOIP would most likely be:

(A) Too high

(B) Too low

(C) Correct

(D) Independent of water influx

25. What group of commonly occurring sedimentary deposits is formed by precipitation of salts from landlocked bodies of concentrated solutions or brines?

(A) Sulfuric sedimentary rocks

(B) Organic sedimentary rocks

(C) Evaporitic sedimentary rocks

(D) Phosphatic sedimentary rocks

PART B (SECTION - 1): FOR GEOLOGY CANDIDATES ONLY

26. Which of the following rocks are most likely to be associated with Carbonatites ?

(A) Ijolites

(B) Komaliites

(C) Anorthosites

(D) Nepheline syenites

27. If the ratio of SiO_2/ Na_2O in a magma is less than 2, the resulting rocks would be,

(A) Oversaturated

(B) Saturated

(C) Under saturated

(D) Unsaturated

28. The structure characterized by spotted appearance due to incipient crystallization of minerals under Contact metamorphic conditions is termed as

(A) Maculose structure

(B) Myrmekitic structure

(C) Flaser structure

(D) Cataclastic structure

29. The Metamorphism involving the combined effect of uniform pressure and heat is described as

(A) Plutonic metamorphism

(B) Dynamothermal metamorphism

(C) Cataclastic metamorphism

(D) Contact metamorphism

30. Cone sheet dykes dip towards a common centre at the angle of _____ degree.

31. Geothermal gradient in the regions of Precambrian terrain is _____degree/km.

32. In the Krumbein's F- scale (Phi - scale), Pebbles range is _____.

33. Positive gravity anomalies are often associated with

(A) Large cavern systems beneath Earth's surface

(B) Deep ocean trenches

(C) Ore bodies beneath Earth's surface

(D) Subduction zones at convergent plate margins

34. Three sets are prominent-one horizontal and two vertical at right angles to each other and to the horizontal set found in granites,

(A) Conjugate joints

(B) Mural joints

(C) Radial joints

(D) Cross joints

35. The gold - uranium conglomerate occur in different diachronous basins around:

(A) 2300 - 2000 m.y. (B) 2600 - 2000 m.y.

(C) 2700 - 2600 m.y. (D) 3000 - 2000 m.y.

36. Match the following:

I	II
1. Disconformity.	i. Non-depositional unconformity.
2. Non-conformity.	ii. Between residual soil and under lying rocks
3. Local-unconformity.	iii. Parallel unconformity
4. Blended unconformity.	iv. Heterolithic unconformity.

(A) 1-iii, 2-iv, 3-i, 4-ii.

(B) 1-i, 2-ii, 3-iii, 4-iv.

(C) 1-ii, 2-iii, 3-iv, 4-i.

(D) 1-iv, 2-i, 3-ii, 4- iii.

37. Fossil fecal pellets of ancient animals are described as

(A) Gastroliths

(B) Coprolites

(C) Beekite rings

(D) Pseudo-fossils

38. Lead and zinc deposits in Missouri are found in Paleozoic rocks of this period:

(A) Cambrian

(B) Mississippian

(C) Ordovician

(D) All of the above

39. In the Ordovician, carbonate reef deposition resulted from

(A) Chemical precipitation in a saturated lake

(B) Calcium carbonate secreting organisms

(C) Formation of ooids in a deep sea environment

(D) Evaporation within a shrinking continental basin

40. The basin within the Tippecanoe Sequence in which evaporites precipitated is the

(A) Cordilleran

(B) Michigan

(C) Ouachita

(D) Taconic

41. Prokaryotes were the only life-form on the earth

(A) For about 1.5 billion years.

(B) For about millions of years.

(C) For about 2.5 billion years.

(D) For more than 2.5 billion years.

42. A cleavage consisting of closely spaced micro faults of fracture that divide the rock into a series of tabular bodies is known as:

(A) Slaty cleavage.

(B) Fracture cleavage.

(C) Shear cleavage.

(D) Bedding cleavage.

43 A sandstone interbedded with slate into long parallel slabs with smooth rounded surfaces will form:

(A) Boudinage

(B) Rodding.

(C) Sandstone lensing.

(D) Mullions.

44. The chlorinate of the sea water is referred as:

(A) Total amount in grams of chloride in 1 kg of sea water.

(B) Total amount in grams of chloride and bromide in 1 kg of seawater

(C) Total amount in grams of chloride, bromide and iodine in 1 kg of seawater.

(D) Total amount in grams of chloride and carbonates in 1 kg of sea water.

45. Which compound forms a colored aqueous solution?

(A) $CaCl_{22}$

(B) $CrCl_3$

(C) NaOH

(D) KBr

46. Radiocarbon is produced in the atmosphere as a result of

(A) Collision between fast neutrons and nitrogen nuclei present in the atmosphere

(B) Action of ultraviolet light from the sun on atmospheric oxygen

(C) Action of solar radiations particularly cosmic rays on carbon dioxide present in the atmosphere

(D) Lightning discharge in atmosphere

47. The atom formed by the beta decay of carbon-14 is...

(A) Oxygen-18

(B) Beryllium-10

(C) Boron-14

(D) Nitrogen-14

COMMON DATA QUESTIONS: (48-49)

Sedimentary structures are those structures formed during sediment deposition.

48 Which of the following is Secondary Sedimentary Structures?

(A) Flaser bedding

(B) Wavy bedding

(C) Lenticular bedding

(D) graded bedding

49. Factors might disrupt fine scale laminations in mudrocks include:

(A) Flocculation of clays - clumping before particles settle

(B) Bioturbation - disturbance by organisms (right)

(C) Both (A) and (B)

(D) None of these

COMMON DATA QUESTIONS: (50-51)

A fault is a planar fracture or discontinuity in a volume of rock, across which there has been significant displacement along the fractures as a result of earth movement. Large faults within the Earth's crust result from the action of plate tectonic forces, with the largest forming the boundaries between the plates, such as subduction zones or transform faults.

50. The low angle faults with normal fault displacement that originate from the upward movement of the footwall block is known as:

(A) Kink fault.

(B) Slip fault.

(C) Lag fault.

(D) Recumbent fault.

51. Mark the correct statement regarding shear faults:

(A) It takes place in horizontal direction along the strike of fault plane.

(B) It takes place in vertical direction along the strike of fault plane.

(C) It occurs in horizontal direction perpendicular to the strike of fault plane.

(D) It occurs in vertical direction perpendicular to the strike of fault plane.

LINKED QUESTIONS: (52-53)

Igneous rocks can be identified by their textures, mineral content, and color.

52. Glassy texture igneous rocks contains:

(A) Andesite

(B) Pumice

(C) Basalt

(D) Rhyolite

53. The size of mineral crystals in igneous rocks _____.

(A) Helps classify the rocks

(B) Depends on the temperature at which magma forms

(C) Depends on the mineral content of magma

(D) All of the above

LINKED QUESTIONS: (54-55)

Structural geology is the study of the three-dimensional distribution of rock units with respect to their deformational histories. Structural geologists use a variety of methods to (first) measure rock geometries, (second) reconstruct their deformational histories, and (third) calculate the stress field that resulted in that deformation.

54. Which process or processes can be attributed to the formation of both outliers and inliers:

(A) Folding.

(B) Faulting.

(C) Erosion.

(D) All the above.

55. Repetition of beds on a geological map may be due to:

(A) Folding.

(B) Weathering.

(C) Unconformity

(D) Disconformity.

PART B (SECTION 2): FOR GEOPHYSICS CANDIDATES ONLY

26. Which of the following is not an enantiomorphic form?

(A) Pedion

(B) Tetraoid

(C) Trapezohedron

(D) Hexahedron

27. E-W striking axial plane foliation and NW - NE striking bedding are observed on the NE limb of a plunging syncline. The approximate direction of plunge of the synclinal axis is towards the

(A) North

(B) South

(C) East

(D) West

28. What are the two most abundant elements by mass found in Earth's crust?

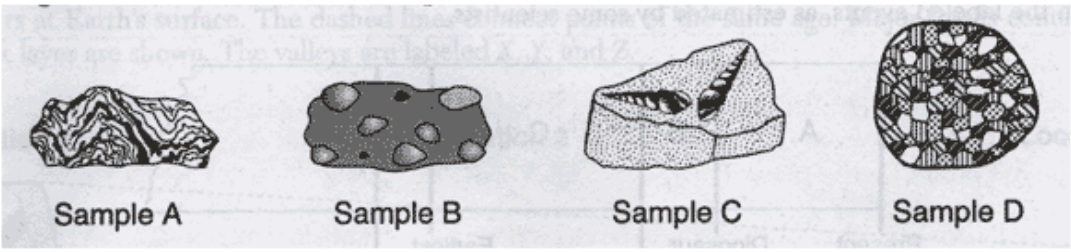
(A) Aluminum and iron

(B) Sodium and chlorine

(C) Calcium and carbon

(D) Oxygen and silicon

29. Which sample best shows the physical properties normally associated with regional metamorphism?



(A) A

(B) B

(C) C

(D) D

30. Compared to dull and rough rock surfaces, shiny and smooth rock surfaces are most likely to cause sunlight to be

(A) Reflected

(B) Refracted

(C) Scattered

(D) Absorbed

31. Intrusive igneous rocks form____.

(A) Fine-grained rocks

(B) When a molten mass of rocks cools quickly

(C) On Earth's surface

(D) Coarse-grained rocks

32. A map view of surface air movement in a low-pressure system is shown below.

The air near the center of this low-pressure system usually will

(A) Evaporate into a liquid

(B) Reverse direction

(C) Rise and form clouds

(D) Squeeze together to form a high-pressure system

33. Which of the following sharks has a tail that can be as long as its body?

(A) Tiger shark

(B) Great white shark

(C) Thresher shark

(D) Weasel Shark

34. Choose the correct statement about graphite:

(A) It crystallizes in a hexagonal system.

(B) It has good conductivity of heat and electricity.

(C) It has a high refractoriness.

(D) All the above are correct

35. Malachite and Azurite are:

(A) Sulphides.

(B) Carbonates.

(C) Oxides.

(D) Hydroxides.

36. Which state is the leading producer of gypsum?

(A) Rajasthan.

(B) Tamil Nadu.

(C) Gujarat.

(D) Uttar Pradesh.

37. The temperature at which air becomes saturated and produces liquid is called

(A) The saturation point

(B) The dew point

(C) The condensation point

(D) Relative humidity

38. What does La Nina bring to the southeastern United States?

(A) Warmer winters

(B) Extremely cold winters

(C) Hot summers

(D) Cooler than normal summers

39. Which of the following ocean currents flow without obstruction or barriers round Earth?

(A) Gulf Stream

(B) California Current

(C) Antarctic Circumpolar Currents

(D) Aghulas Currents

40. A temperate lake is most likely to show thermal stratification and limited mixing of surface and deeper water during the _____ season.

(A) Winter

(B) Spring

(C) Summer

(D) Fall

41. If you are using biomass as a source of energy you might be:

(A) Heating with coal.

(B) Heating with natural gas.

(C) Heating with petroleum.

(D) Heating with a wood stove.

42. In _____ decade wind-generated electricity was first sold to the public.

43. In _____ century the first electrical power plant was built.

44. Which of the following energy sources produces the most electricity in the United States?

(A) Coal

(B) Hydropower

(C) Natural gas

(D) Uranium (nuclear power)

45. Which of the following scientists was awarded the Nobel Prize in 1911 for the discovery of the radioactive elements, radium and polonium?

(A) John Dalton

(B) Dmitri Mendeleev

(C) Emil Fischer

(D) Marie Curie

46. Lead-206 is the final product of the radioactive decay series named the:

(A) Thorium series

(B) actinium series

(C) Uranium series

(D) neptunium series

47. The temperature levels in a nuclear reactor are maintained primarily by the use of

(A) Shielding

(B) coolants

(C) Moderators

(D) control rods

COMMON DATA QUES. (48-49)

Let x(t) be the sum of sinusoidal signals

$x(t) = 4 + 3\cos(\pi t) + 2\cos(2\pi t) + \cos(3\pi t)$

where t is in milliseconds.

48. Determine the minimum sampling rate that will not cause any aliasing effects, that is, the Nyquist rate. To observe such aliasing effects, suppose this signal is sampled at half its Nyquist rate.

(A) [-0.75, 0.75] kHz

(B) [-0.25, 0.25] kHz

(C) [-0.50, 0.50] kHz

(D) [-0.50, 0.25] kHz

49. Determine the signal $x_a(t)$ that would be aliased with x(t).

(A) $5 + 2\cos(\pi t)$

(B) $5 + 5\cos(\pi t)$

(C) $5 + 5\sin(\pi t)$

(D) $3 + 5\cos(\pi t)$

COMMON DATA QUES. (50-51)

The signal

$x(t) = \sin(\pi t) + 4\sin(3\pi t)\cos(2\pi t)$

where t is in msec, is sampled at a rate of 3 kHz.

50. Determine the signal $x_a(t)$ aliased with x(t).

(A) $\cos(\pi t)$

(B) $\sin(5\pi t)$

(C) $\sin(\pi t)$

(D) $\sin(2\pi t)$

51. Determine two other signals $x_1(t)$ and $x_2(t)$ that are aliased with the same $x_a(t)$, that is, such that $x_1(nT) = x_2(nT) = x_a(nT)$.

(A) {1.5, 3.5} & {4.5, 5.5}

(B) {3.5, 2.5} & {6.5, 5.5}

(C) {3.5, 2.5} & {6.5, 5.5}

(D) {0.5, 1.5} & {4.5, 3.5}

LINKED ANSWER QUES. (52-53)

A 10-millisecond portion of a signal is sampled at a rate of 10 kHz. It is known that the signal consists of two sinusoids of frequencies f_1 = 1 kHz and f_2 = 2 kHz. It is also known that the signal contains a third component of frequency f_3 that lies somewhere between f_1 and f_2.

52. How close to f1 could f3 be in order for the spectrum of the collected samples to exhibit three distinct peaks? How close to f_2 could f_3 be?

(A) 1.9 & 2.5 kHZ

(B) 1.1 & 1.9 kHZ

(C) 1 & 2.2 kHZ

(D) 0.5 & 1.2 kHZ

53. If the collected samples are windowed by a Hamming window then the answer is _____

LINKED ANSWER QUES. (54-55)

For given sequence:

$$x(n) = \{4, 2, -1, 0, 3, -4\}, \quad \uparrow \text{ at } -1$$

54. Find the z-transform-

(A) $4z^2 + 2z - 1 + 3z^{-2} - 4z^{-3}$

(B) $4z^2 - z - 1 + 2z^{-2} - 4z^{-3}$

(C) $2z^2 + 3z - 1 + 5z^{-2} - 4z^{-3}$

(D) $z^2 + 2z - 1 - 3z^{-2} - 5z^{-3}$

55. ROC of the given sequence-

(A) $1 < |z| < \infty$

(B) $2 < |z| < 5$

(C) $5 < |z| < \infty$

(D) $0 < |z| < \infty$

PART C (GENERAL APTITUDE (GA) QUESTIONS)

56. What is the synonyms of Gaudy ?

(A) Sentimental

(B) Mild

(C) Whimsical

(D) Showy

57. What is the synonyms of Ecstasy ?

(A) Treasure

(B) Warmth

(C) Lack

(D) Joy

58. What is the Antonyms of Cranky ?

(A) Grouchy

(B) Crotchety

(C) Perverse

(D) Good-natured

59. What is the Antonyms of Aggressive ?

(A) Not getting justice

(B) Militant

(C) Retiring

(D) Noisy

60. Succulent : Infertile

(A) Desert : Rainforest

(B) Leafy : Rooted

(C) Inhabited : Isolated

(D) Lush : Desolate

61. Stock analyst : "We believe Company A's stock will appreciate at 35 % a year for the next 5 to 7 years. Company A just become the leader in its industry and we expect its sales to grow at 8 % a year."

Commentator: "But how can the stock's price be expected to grow more quickly than the company's underlying sales ?"

Which of the following facts would best support the stock analyst ?

(A) The company's expenses will be declining over the next 5 to 10 years.

(B) The company just won a patent on a new product.

(C) Company A's stock is currently overvalued by a significant amount.

(D) The 5 to 7 year time frame is too long for anyone to accurately forecast.

62. 5 Chairs cost as much as 12 stools, 7 stools as much as 2 tables, 3 tables as much as 2 sofas. If the cost of 5 sofas. If the cost of 5 sofas be Rs. 8750, find that of a chair.

(A) 700

(B) 600

(C) 800

(D) 900

63. If 11.25 m of a uniform iron rod weights 42.75 kg, what will be the weight of 6 m of the same rod ?

(A) 21.9(approx.)

(B) 22.9(approx.)

(C) 21.8(approx.)

(D) 22.8(approx.)

64. 1, 5, 14, 30, ..., 91

(A) 45

(B) 55

(C) 46

(D) 60

65. A 10 hectare field is reaped by 2 men, 3 women and 4 boys in 10 days. If a man, a woman and a boy work in the ratio 5 : 4 : 2, then the time that 6 men, 4 women and 7 boys take to reap a 16 hectare field is

(A) 5 days

(B) 6 days

(C) 7 days

(D) 8 days

ANSWER KEY

PART A : COMMON TO BOTH GEOLOGY AND GEOPHYSICS CANDIDATES

Question	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Answer	C	499.72	A	D	C	4.32	D	83	C	B	A	D	B	D	C	D	A
Question	18	19	20	21	22	23	24	25									
Answer	D	D	B	A	B	A	A	C									

PART B (SECTION 2): FOR GEOPHYSICS CANDIDATES ONLY

Question	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Answer	A	B	A	A	40-50	10	-5 to -8	C	B	D	A	B	D	B	B
Question	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Answer	B	B	D	C	B	A	D	A	C	C	A		A	D	A

PART B (SECTION 2): FOR GEOPHYSICS CANDIDATES ONLY

Question	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Answer	D	C	D	A	A	D	C	C	D	B	A	B	A	C	C
Question	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
Answer	D	1940	1880	A	D	C	B	A	B	C	B	D	1.2 & 1.8	A	D

PART C (GENERAL APTITUDE (GA) QUESTIONS)

Question	56	57	58	59	60	61	62	63	64	65
Answer	D	C	D	C	D	A	C	D	B	D

HINTS AND SOLUTIONS

PART A: COMMON TO BOTH GEOLOGY AND GEOPHYSICS CANDIDATES

1.(C) Big-Bang Theory - AbbGeorges Lemaitre
Pulsating Universe Theory - Dr. Allan Sandage
Steady State Theory - Thomas Gold and Herman Bondi
Dynamic Encounter Theory - Buffen

2. **499.720**

The Sun is the most prominent feature in our solar system. It is the largest object and contains approximately 98% of the total solar system mass. One hundred and nine Earths would be required to fit across the Sun's disk, and its interior could hold over 1.3 million Earths. The time taken for light from sun to earth is 499.720 secs.

3.(A) Hawaiin volcanism belongs to MOR vaolcanism. Each Hawaiian island is made of one or more volcanoes, which first erupted on the sea floor and only emerged above the ocean's surface after countless eruptions.

4.(D) The layers of rock having intermediate P wave velocities between 7.2 – 7.7 km/sec are characteristic of continental Margin. The continental margin is the zone of the ocean floor that separates the thin oceanic crust from thick continental crust. Together, the continental shelf, continental slope, and continental rise are called continental margin.

5.(C) The Indian Ocean is the third largest of the world's oceanic divisions, covering approximately 20% of the water on the Earth's surface.

The Atlantic Ocean is the world's second largest ocean. Only the Pacific Ocean is larger.

- Mindanao Deep - Pacific Ocean
- Planet Deep - Indian Ocean
- Milwaukee Deep -Atlantic Ocean
- Nares Deep - Atlantic Ocean

6. **4.32**

Lapilli is a size classification term for tephra, which is material that falls out of the air during a volcanic eruption or during some meteorite impacts .Lapilli are the pyrocalstic material having the size range 4.32 mm.

7.(D) Sedimentary rocks are types of rock that are formed by the deposition of material at the Earth's surface and within bodies of water. Sedimentation is the collective name for processes that cause mineral and/or organic particles (detritus) to settle and accumulate or minerals to precipitate from a solution.

8. **83**

The mantle is one of the three major layers of the Earth, which geologists often compare to a hard-boiled egg, with the mantle analogous to the white of the egg. The mantle is largest of the layers, making up about 83 percent of the Earth's volume.

9.(C) The data of the rocks of the oceanic crust is not older than jurrasic. The Jurassic is a geologic period and system that extends from 201.3± 0.6 Ma (million years ago) to 145± 4 Ma; from the end of the Triassic to the beginning of the Cretaceous.

10.(B) The thickness of the crust varies by the top and the bottom is not derived from pratt's hypothesis of isostacy.Pratt's hypothesis of isostacy proposed that topography is produced by crustal blocks with varying density, that terminate at a uniform depth.

11.(A) Transform faults boundaries are characterised by shallow focus earthquakes of depths less than 15km.A transform fault or transform boundary, also known as conservative plate boundary since these faults neither create nor destroy lithosphere, is a type of fault whose relative motion is predominantly horizontal in either sinistral or dextral direction.

12.(D) Mafic is an adjective describing a silicate mineral or rock that is rich in magnesium and iron; the term is a portmanteau of the words "magnesium" and "ferric".

13.(B) Halite, commonly known as rock salt, is the mineral form of sodium chloride (NaCl). Halite forms isometric crystals. The mineral is typically colorless or white, but may also be light blue, dark blue, purple, pink, red, orange, yellow or gray depending on the amount and type of impurities.Halite is white or colorless, has a hardness of 2.5 and splits with cubic cleavage.

14.(D) The lines joining the points of equal thickness of a particular stratigraphic units are known as Isopaches. A Isospaches is a line drawn on a map connecting all points of equal thickness of a particular geologic formation.

15.(C) Sediments derived from the erosion of a land area, outside the basin of deposition and carried into the basin, such solid materials are Terrigenous in nature.

16.(D) Silver metal is the most mobile from the dispersion of ions in relation to ore deposits.Silver is a chemical element with the chemical symbol Ag and atomic number 47. A soft, white, lustrous transition metal, it possesses the highest electrical conductivity of any element and the highest thermal conductivity of any metal.

17.(A) Granite is a common type of intrusive, felsic, igneous rock which is granular and phaneritic in texture. This rock consists mainly of quartz, mica, and feldspar. Occasionally some individual crystals (phenocrysts) are larger than the groundmass, in which case the texture is known as porphyritic.

18.(D) Electromagnetic waves in order from longest to shortest wavelength:

- radiowave -30cm
- microwave 1nm-30cm
- infrared 700nm-1nm
- visible light 400nm-700nm the only wave that can be seen by human eyes
- ultraviolet 60nm-400nm
- x rays 0.001nm-60nm
- gamma rays >0.1nm

19.(D) Geochemical prospecting is concerned primarily with the examination of the rocks,water and gases.The use of geochemical and biogeochemical principles and data in the search for economic deposits of minerals, petroleum, and natural gases.

20.(B) The Granulite facies is characterised by the absence of micas .Granulites are medium to coarse–grained metamorphic rocks that have experienced high-temperature metamorphism, composed mainly of feldspars sometimes associated with quartz and anhydrous ferromagnesian minerals, with granoblastic texture and gneissose to massive structure.

21.(A) coal is the enregy source which produces the most electricity in the united states. Coal is a combustible black or brownish-black sedimentary rock usually occurring in rock strata in layers or veins called coal beds or coal seams. The harder forms, such as anthracite coal, can be regarded as metamorphic rock because of later exposure to elevated temperature and pressure.

22.(B) Hydropower is a renewable source of energy. Renewable energy is a socially and politically defined category of energy sources. Renewable energy is generally defined as energy that comes from resources which are continually replenished on a human timescale such as sunlight, wind, rain, tides, waves and geothermal heat.

23.(A) Igneous rock is one of the three main rock types, the others being sedimentary and metamorphic rock. Igneous rock is formed through the cooling and solidification of magma or lava. An igneous rock consisting of the minerals orthoclase, quartz, muscovite, hornblende, biotite and plagioclase is likely, upon significant physical and chemical weathering, to produce sediment containing clay minerals, quartz and muscovite.

24.(A) A commercial oil reservoir has recently been discovered. If water influx is present but ignored in early material balance calculations of original oil in place, the calculated value for OOIP would most likely be too high where water influx means the incursion of water (natural or injected) into oil- or gas-bearing formations.

25.(C) Evaporitic sedimentary rocks are formsedby precipitation of salts from landlocked bodies of concentrated solutions or brines.

PART B (SECTION - 1): FOR GEOLOGY CANDIDATES ONLY

26.(A) Ijolites form characteristic members of carbonatite–alkali igneous complexes, such as those of Alno, Swed.; Fen, Nor.; Kola Peninsula, Russia, where they contain abundant wollastonite; and Iron Hill, Colo., U.S. Ijolite, intrusive igneous rock that is composed essentially of nepheline and an alkali pyroxene, usually aegirine-augite.

27.(B) Silica saturated rocks contain just enough silica that quartz does not appear, and just enough silica that one of the silica undersaturated minerals does not appear. The ratio of SiO_2/ Na_2O in a saturated rocks is less than 2.

28.(A) Maculose is a group of contact-metamorphosed rocks or their structures, having spotted or knotted character, each spot representing a fine-grained aggregate of minerals.

29.(A) Plutonic metamorphism involves the combined effect of uniform pressure and heat. It is deep-seated regional metamorphism at high temperatures and pressures, often accompanied by strong deformation.

30.(B) **40 – 50**

Structural data were collected on 1100 cone sheets and dykes with the aim of reconstructing the geometry of the complex, recognizing emplacement phases, and contributing to understanding this classical area and the evolution of cone sheets in general. Cone sheet dykes dip towards a common centre at the angle of 40°, 43°, 47° and 50° in four sections transecting the complex.

31. **10**

The Precambrian is actually a segment of time that includes two eons, the Proterozoic and the Archaean that span billions of years. The oldest rocks on earth formed during this time, as well as the first continents, and the earliest, simplest forms of life. In the regions of Precambrian terrain the geothermal gradient is 10°/ km.

32. **– 5 to – 8**

The Krumbein and Monk equation is used to estimate the permeability (in darcies) of a sediment from a grain size analysis. This equation was developed empirically using very well sorted sediment samples ranging from -0.75 to 1.25ϕ in mean grain size, and with standard deviations ranging from 0.04 to 0.80ϕ. In the Krumbein's F - scale (Phi - scale), Pebbles range is – 5 to – 8.

33.(C) The Bouguer anomalies usually are negative in the mountains because of isostasy: the rock density of their roots is lower, compared with the surrounding earth's mantle. Typical anomalies in the Central Alps are -150 milligals (-1.5 mm/s²). Rather local anomalies are

used in applied geophysics: if they are positive, this may indicate metallic ores. At scales between entire mountain ranges and ore bodies, Bouguer anomalies may indicate rock types.

34.(B) In granites and granodiorites several sets of joints may be observed, but commonly three set are prominent-one horizontal and two vertical at right angles to each other and to the horizontal set. When these sets are more or less equally spaced, the fracture planes give rise to cubical or rectangular blocks. Such a jointing is called mural jointing.

35.(D) Gold is produced from seven goldfields within different diachronous basins, mainly from conglomerate horizons of the Witwatersrand, Ventersdorp and Transvaal Supergroups around 3000 - 2000 m.y.

36.(A) A disconformity is an unconformity between parallel layers of sedimentary rocks which represents a period of erosion or non-deposition.

Non-conformity is commonly applied to structures in which the older formation made up essentially of plutonic Tocks, is overlain unconformably by sedimentary rocks or lava-flows. According to some geologists, it should be termed as 'Heterolithic unconformity.

Local-unconformity is also known as a 'non-depositional unconformity. It is similar to diseonformity, but it is local in extent and hence the name. The time involved is also short. Thus it represents a short period of non-deposition.

Blended unconformity is a surface of erosion, which may be covered by a thick residual soil that grades into the underlying bed rock.

37.(B) Fossil fecal pellets of ancient animals are described as coprolites. A coprolite is fossilized feces. Coprolites are classified as trace fossils as opposed to body fossils, as they give evidence for the animal's behaviour (in this case, diet) rather than morphology.

38.(D) Lead and zinc deposits are occur in breccias at different horizons in the Knox dolomite, of Cambrian, Mississippian and Ordovician age in Missousri.

39.(B) In the Ordovician, carbonate reef deposition resulted from calcium carbonate secreting organismsThe Ordovician was a time of calcite sea geochemistry in which low-magnesium calcite was the primary inorganic marine precipitate of calcium carbonate.

40.(B) The Tippecanoe sequence was the cratonic sequence--that is, the marine transgression--that followed the Sauk sequence; it extended from roughly the Middle Ordovician to the Early Devonian. The massive evaporite deposits of the Michigan Basin were created during this period.

41.(B) Prokaryotes were the only form of life on Earth for millions of years until more complicated eukaryotic cells came into being through the process of evolution.

42.(B) A cleavage consisting of closely spaced micro faults of fracture that divide the rock into a series of tabular bodies is known as fracture cleavage. Fracture is the tendency of a mineral to break along curved surfaces without a definite shape. These minerals do not have planes of weakness and break irregularly.

43.(D) A sandstone interbedded with slate into long parallel slabs with smooth rounded surfaces will form mullions. A mullion describes a linear, cylindrical structure comprised of elongated rods or columns 20 millimetres to 2 metres across and up, to 100 metres long. The surface may be smooth or corrugated and define a lineation parallel to fold axes. Mullion structures are most common in strongly deformed metamorphic rocks, and may form by buckling of the surface between strong and weak rock beds.

44.(C) The chlorinate of the sea water is referred as total amount in grams of chloride, bromide and iodine in 1 kg of sea water. In Sea water at pH 7.4 - 8.1 chlorine is available as fast acting Hypochlorous acid. However Sea water also contains bromide and iodine ion which displaces the chlorine, being a stronger oxidizing agent to produce hypobromous acid.

45.(B) Colored aqueous solutions are a characteristic of transition compounds. The only transition compound in the above choices is $CrCl_3$. Cr is a transition element.

46.(A) Most of the radiocarbon found on earth is formed naturally in the upper atmosphere. High-energy cosmic rays (from outside the solar system) are constantly bombarding the upper atmosphere. These high-energy particles undergo a whole cascade of nuclear reactions resulting in some slow moving neutrons. These neutrons react with nitrogen atoms in the atmosphere and radiocarbons are formed.

47.(D) A neutron was changed to a proton thereby increasing the atomic number of the element by one. The identity of the element with an atomic number of 7 is nitrogen.

48.(A) Graded bedding is a Secondary Sedimentary Structures. All of three are primary sedimentary structures.

49.(C) Factors might disrupt fine scale laminations in mudrocks include:

- Flocculation of clays - clumping before particles settle
- Bioturbation - disturbance by organisms

50.(C) The low angle faults with normal fault displacement that originate from the upward movement of the footwall block is known as Lag fault.

51.(A) Shear faults takes place in horizontal direction along the strike of fault plane.

52.(B) Glassy textures igneous rocks contains pumice and obsidian. All other three are fine-grained (aphanitic texture).

53.(A) The size of mineral crystals in igneous rocks helps classify the rocks.

54.(D) The processes that can be attributed to the formation of both outliers and inliers are folding, faulting and erosion.

55.(A) Repetition of beds on a geological map may be due to folding.

PART B (SECTION - 2): FOR GEOPHYSICS CANDIDATES ONLY

26.(D) Either of a pair of objects related to each other as the right hand is to the left, that is, as mirror images that cannot be reoriented so as to appear identical. An object that has a plane of symmetry cannot be an enantiomorph because the object and its mirror image are identical.

27.(C) The plunge of the fold axis in this case will be towards east because the axial plane foliation indicates the strike of the axial plane, that is E-W. Noe in the NE limb the bedding NW-NE. So the plunge direction is towards east.

28.(D) The most abundant element in the earth's crust is oxygen, making up 46.6% of the Earth's mass. Silicon is the second most abundant element (27.7%), followed by aluminum (8.1%), iron (5.0%), calcium (3.6%), sodium (2.8%), potassium (2.6%). and magnesium (2.1%). These eight elements account for approximately 98.5% of the total mass of the earth's crust.

29.(A) Sample A is a metamorphic rock. This is determined by the bands (lines) found in the rock sample. Knowing that the sample is metamorphic with bands it can be inferred that the sample is gneiss.

30.(A) Shiny materials will reflect sunlight similar to what happens with ones image in a mirror. This is also simulated with a dark and light shirt on a sun filled day. The dark shirt will absorb the light (warm) as where the light colored shirt will reflect the sunlight (cool).

31.(D) Intrusive igneous rocks are formed from magma that cools and solidifies underground. These rocks are coarse grained. The mineral grains in such rocks can generally be identified with the unaided eye.

32.(C) The winds around a Low are counterclockwise and in. This motion will take the air toward the center then up in the atmosphere. This causes a rise in evaporation and eventually cloud formation. A Low is consistent with Lousy weather. A High is consistent with Dry weather.

33.(C) Thresher sharks are large lamniform sharks of the family Alopiidae found in all temperate and tropical oceans of the world; the family contains three species, all within the genus Alopias and has a tail that can be as long as its body.

34.(D) Natural graphite is an allotrope of elemental carbon, which crystallizes in the hexagonal system. Graphite can conduct electricity due to the vast electron delocalization within the carbon layers (a phenomenon called aromaticity). The conductive properties of powdered graphite allowed its use as a semiconductor substitute in early carbon microphones. Graphite has a high refractoriness which is used to hold molten metal.

35.(B) Azurite and malachite are simple copper carbonates and have similar chemical compositions. When they grow together, they carry the properties of the two minerals. Because they are both copper based minerals, this duo is a powerful conductor of energy.

36.(A) Rajasthan is the leading producer of gypsum. About 90% of the total Indian production of gypsum comes from western and north-western Rajasthan having a total reserve of 1013.07 million tones.

37.(B) The saturation point is the maximum amount of water vapor that a particular volume of air at a given temperature can hold. The condensation point is the temperature and pressure

at which water vapor turns into liquid water. Absolute humidity is the mass of water vapor in a given volume of air. Relative humidity is the ratio of actual amount of water vapor held in the atmosphere compared with the maximum amount that the air could hold and is influenced by temperature and atmospheric pressure.

38.(A) La Nina can bring warm winters to the southeast and cooler-than-normal winter temperatures to the northwest United States. It is the cold counterpart of El Nino. La Nina's strong easterly winds bring cold ocean water to the surface in the eastern Pacific and causes increased rainfall in the western Pacific. The jet stream rather than coming through the Pacific Northwest is diverted over Alaska and into the Great Lakes region.

39.(C) The Antarctic Circumpolar Current is the most powerful ocean current system on Earth and exerts a strong influence on climate. It circles Earth in the southern hemisphere and connects the three great ocean basins-Atlantic, Indian, and Pacific. Unlike in the Northern Hemisphere, there are no land masses to break up this large, continuous stretch of water.

40.(C) During the summer, the surface water warms up must faster than the deep water. The warmer surface water is less dense than the cooler, deep water, so it stays on the surface. The wind mixes the surface water but only near the surface. The lake tends to become stratified, with a warmer upper layer or epilimnion and a cooler lower layer or hypolimnion. The boundary between the two is called a thermocline.

41.(D) Biomass is an energy source that comes from organic matter (anything once living) like wood, crops and animal waste. People have been burning wood to heat their homes and cook their food for thousands of years. This makes biomass the energy source that has been used the longest. Biomass is a renewable energy source because plants can be re-grown, and animals always produce waste.

42. 1940

Humans have been using wind energy for centuries to do things like sail boats. Individual windmills were originally used to pump water out of the ground. In 1941 the first large-scale wind turbine, the Putnam-Smith Wind Turbine, was built in Castleton, VT, and generated 1.25 megawatts (1250 kW) of power. Its electricity was sold to the Central Vermont Public Service Corporation for sale to customers.

43. 1880

The Edison Company built the first large-scale, permanent power plant, Pearl Street Power Station that opened on September 4, 1882 in New York. The steam-driven plant was rated at 100 kilowatts and served 500 customers. On September 30, 1882, the first commercial hydroelectric power plant opened in Appleton, Wisconsin, rated at 12 kilowatts. It initially serviced the Appleton and Vulcan paper mills as well as the home of the Appleton Paper Mill president.

44.(A) According the to the U.S. Energy Information Administration's 2009 numbers, the breakdown of electricity generation in the United States is as follows:

Nonrenewable Sources	Renewable Sources
45.9% Coal	7% Hydropower
22.0% Natural Gas	1.9% Wind
20.9% Uranium (nuclear)	0.7% Biomass
0.9% Petroleum (oil)	0.4% Geothermal
0.3% Other	

45.(D) The Royal Academy of Sciences, at the session on the 7th of November of this year, decided to award the Nobel Prize for Chemistry for 1911 to Madame Marie Sklodowska Curie, Professor at the Faculty of Sciences of Paris, "in recognition of the part she has played in the development of chemistry:

o By the discovery of the chemical elements radium and polonium;

o By the determination of the properties of radium and by the isolation of radium in its pure metallic state; and finally,

o by her research into the compounds of this remarkable element."

46.(C) Lead (Pb) has four stable isotopes: ^{204}Pb, ^{206}Pb, ^{207}Pb, ^{208}Pb. Lead-204 is entirely a primordial nuclide and is not a radiogenic nuclide. The three isotopes lead-206, lead-207, and lead-208 represent the ends of three decay chains called the uranium series (or radium series), the actinium series, and the thorium series, respectively.

47.(B) Because heat flows from warm objects to colder objects, the coolant liquid is used to absorb heat generated by the reactor. The coolant prevents temperatures in the reactor

from overheating (meltdown). The coolant liquid carries the unused heat to an outside cooling tower--there is a large cooling tower at Nine Mile 2. Some of the heat will be sent to a boiler to generate steam and turn the turbines that generate electricity. Shielding prevents radiation leaks; moderators slow down nuclear reactions; control rods absorb neutrons and halt the reaction.

48.(A) The frequencies of the four terms are: $f_1 = 0$, $f_2 = 0.5$ kHz, $f_3 = 1$ kHz, and $f_4 = 1.5$ kHz (they are in kHz because t is in msec). Thus, $f_{max} = f_4 = 1.5$ kHz and the Nyquist rate will be $2f_{max} = 3$ kHz. If x(t) is now sampled at half this rate, that is, at $f_s = 1.5$ kHz, then aliasing will occur. The corresponding Nyquist interval is [-0.75, 0.75] kHz. The frequencies f_1 and f_2 are already in it, and hence they are not aliased, in the sense that $f_{1a} = f_1$ and $f_{2a} = f_2$. But f_3 and f_4 lie outside the Nyquist interval and they will be aliased with

$$f_{3a} = f_3 \bmod(f_s) = 1 \bmod(1.5) = 1 - 1.5 = -0.5 \text{ kHz}$$

$$f_{4a} = f_4 \bmod(f_s) = 1.5 \bmod(1.5) = 1.5 - 1.5 = 0 \text{ kHz}$$

49.(B) The aliased signal $x_a(t)$ is obtained from x(t) by replacing f_1, f_2, f_3, f_4 by $f_{1a}, f_{2a}, f_{3a}, f_{4a}$. Thus, the signal

$$x(t) = 4\cos(2\pi f_1 t) + 3\cos(2\pi f_2 t) + 2\cos(2\pi f_3 t) + \cos(2\pi f_4 t)$$

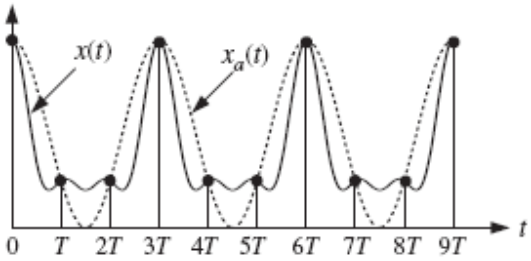
will be aliased with

$$x_a(t) = 4\cos(2\pi f_{1a} t) + 3\cos(2\pi f_{2a} t) + 2\cos(2\pi f_{3a} t) + \cos(2\pi f_{4a} t)$$

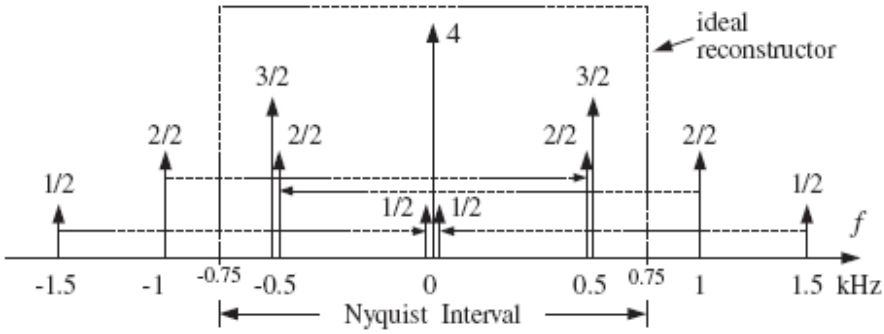
$$= 4 + 3\cos(\pi t) + 2\cos(-\pi t) + \cos(0)$$

$$= 5 + 5\cos(\pi t)$$

The signals x(t) and $x_a(t)$ are shown below. Note that they agree only at their sampled values, that is, $x_a(nT) = x(nT)$. The aliased signal $x_a(t)$ is smoother, that is, it has lower frequency content than x(t) because its spectrum lies entirely within the Nyquist interval, as shown below:



The form of $x_a(t)$ can also be derived in the frequency domain by replicating the spectrum of x(t) at intervals of f_s = 1.5 kHz, and then extracting whatever part of the spectrum lies within the Nyquist interval. The following figure shows this procedure.



Each spectral line of x(t) is replicated in the fashion of Fig. The two spectral lines of strength 1/2 at $f_4 = \pm 1.5$ kHz replicate onto f = 0 and the amplitudes add up to give a total amplitude of (4 + 1/2 + 1/2)= 5. Similarly, the two spectral lines of strength 2/2 at $f_3 = \pm 1$ kHz replicate onto f = .0.5 kHz and the amplitudes add to give (3/2+2/2)= 2.5 at f = ± 0.5 kHz. Thus, the ideal reconstructor will extract $f_1 = 0$ of strength 5 and $f_2 = \pm 0.5$ of equal strengths 2.5, which recombine to give:

$5 + 2.5e^{2\pi j0.5t} + 2.5e^{-2\pi j0.5t} = 5 + 5\cos(\pi t)$

This example shows how aliasing can distort irreversibly the amplitudes of the original frequency components within the Nyquist interval.

50.(C) To determine the frequency content of x(t), we must express it as a sum of sinusoids. Using the trigonometric identity 2 sin a cos b = sin(a + b)+sin(a . b), we find:

$x(t) = \sin(\pi t) + 2[\sin(3\pi t + 2\pi t) + \sin(3\pi t - 2\pi t)] = 3\sin(\pi t) + 2\sin(5\pi t)$

Thus, the frequencies present in x(t) are $f_1 = 0.5$ kHz and $f_2 = 2.5$ kHz. The first already lies in the Nyquist interval [–1.5, 1, 5] kHz so that $f_{1a} = f_1$. The second lies outside and can be reduced mod f_s to give $f_{2a} = f_2 \bmod(f_s) = 2.5 \bmod(3) = 2.5 - 3 = -0.5$. Thus, the given signal will "appear" as:

$x_a(t) = 3\sin(2\pi f_{1a} t) + 2\sin(2\pi f_{2a} t)$

$= 3\sin(\pi t) + 2\sin(-\pi t) = 3\sin(\pi t) - 2\sin(\pi t)$

$= \sin(\pi t)$

51.(B) To find two other signals that are aliased with $x_a(t)$, we may shift the original frequencies f_1, f_2 by multiples of f_s. For example,

$x_1(t) = 3\sin(7\pi t) + 2\sin(5\pi t)$

$x_2(t) = 3\sin(13\pi t) + 2\sin(11\pi t)$

where we replaced $\{f_1, f_2\}$ by $\{f_1 + f_s, f_2\} = \{3.5, 2.5\}$ for $x_1(t)$, and by $\{f_1 + 2f_s, f_2 + f_s\} = \{6.5, 5.5\}$ for $x_2(t)$.

52.(D) The total number of samples collected is $L = f_s T_L = 10 \times 10 = 100$. The frequency resolution of the rectangular window is $\Delta f = f_s/L = 10/100 = 0.1$ kHz. Thus, the closest f_3 to f_1 and f_2 will be:

$f_3 = f_1 + \Delta f = 1.1$ kHz, and $f_3 = f_2 - \Delta f = 1.9$ kHz

53. **1.2 & 1.8**

In the Hamming case, the minimum resolvable frequency separation doubles, that is, $\Delta f = cf_s/L = 2 \cdot 10/100 = 0.2$ kHz, which gives $f_3 = 1.2$ kHz or $f_3 = 1.8$ kHz.

54.(A) The z-transform X(z) of x(n) is given by

$$X(z) = \sum_{n=-\infty}^{\infty} x(n)z^{-n} = \sum_{n=-2}^{3} x(n)z^{-n}$$
$$= x(-2)z^{2} + x(-1)z^{1} + x(0) + x(1)z^{-2} + x(3)z^{-3}$$
$$= 4z^{2} + 2z - 1 + 0z^{-1} + 3z^{-2} - 4z^{-3}$$
$$= 4z^{2} + 2z - 1 + 3z^{-2} - 4z^{-3}$$

55.(D) Therefore, X(z) will be finite if and only if z is not equal to 0 or ∞. Its ROC is given by $0 < |z| < \infty$.

PART C: GENERAL APTITUDE (GA) QUESTIONS

56.(D) Meaning of Gaudy is Tastelessly showy. Synonyms of Gaudy is showy .

57.(C) Synonyms of Ecstasy is lack. Ecstasy means a state of being carried away by overwhelming emotion.

58.(D) Meaning of Cranky is Easily irritated or annoyed . Antonyms of Cranky is good-natured.

59.(C) Antonyms of Aggressive is retiring.

60.(D) An area that is succulent is not pliant is rigid. Something that is not crude is refined.

61.(A) The company's expenses will be declining over the next 5 to 10 years would best support the stock analyst.

62.(C) x rupees = 1 chair

5 chair = 12 stools

7 stools = 2 tables

3 tables = 2 sofas

5 sofas = 8750 sofas

$\therefore \quad x = \frac{1\times12\times2\times2\times8750}{5\times7\times3\times5} = \mathbf{800}$

63.(D)

Length	**Weight**
11.25	42.75
6	x

more length, more weight. So directly proportional or we have to multiply.

$\therefore$ Required weight, $x = \frac{42.75\times11.25}{6}$

= **22.8 (approx.)**

64.(B) This pattern is $+2^2, +3^2, +4^2, \ldots\ldots$ Missing number = 30 + 25 = 55

65.(D) We have 4 men5 women; 1 man 5/4 women; 2 women 4 boys; 1 women2 boys; 5/4 women 2 × (5/4) boys = 5/2 boys or 1 man 5/4 women 5/2 boys.

Now 2M + 2W + 4B = 2 × 5/2 B + 3 × 2B + 4B = 15 B .

or 15 boys do the work in 10 days (10 hectares).

6M + 4W + 7B = (6 × 5/2 + 4 × 2 + 7) B = 30 boys. 30 boys will do 16 hectares of work in 10 × (15/30) × (16/10) = 8 days.