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UNIVERSITY OF PETROLEUM & ENERGY STUDIES
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End-semester Examination-December, 2017 **Max. Marks: 100**
Name of the Program: B. Tech (*Geosciences Engineering*) **Semester – V**
Course Title: Mineral Exploration and Mining Geology **Code: GSEG 308**
This question paper has 2 (*two*) pages **Duration: 3 hours**

Note: Include appropriate Question Number. Do not split answers on largely separated answer sheets. Overwriting, striking-off answers, illegible answer or any kinds of incorrect scribbling will not attract evaluation. Use pencil while drawing figures and other forms of charts.

Match Column A, B and C and construct appropriate statements. Mere matching does not attract valuation
Questions from 1 to 10 carry 3 (*three*) marks each. Answer all of them? (10 × 03 = 30)

SECTION: A

S. No.	Column A	S. No.	Column B	S. No.	Column C
1.	Mineral Processing Challenges	a)	Comparing rocks from different areas	i)	Joints/ faults
2.	Mountain regions	b)	Cost of Pre-feasibility study	ii)	Iron (III)
3.	Determining Price	c)	Texture	iii)	Copper and Aluminum
4.	Naturally occurring line features	d)	Primary and Supergene	iv)	Float mapping
5.	Thin sections	e)	Contact igneous rock intrusion	v)	Image enhancement
6.	Trenching/ pitting/ drilling	f)	Chromite	vi)	Gypsum
7.	Blocky/ smooth/ rounded	g)	$FeCr_2O_4$	vii)	Aerial photographs
8.	Reconnaissance techniques	h)	Substitution	viii)	Skarn deposits
9.	Magnesite	i)	Spatial filtering	ix)	Reduce the search area
10.	Gangue mineral	j)	Boulders/ rock fragments	x)	Target setting
		k)	Locating mineral deposits	xi)	Sandstone – shale - granite
		l)	False colour composite	xii)	Modal analysis

SECTION: B

Questions from 11 to 20 carry 5 (*five*) marks each. Answer all of them? (10 × 05 = 50)

11. If ***Frequency of repetitive cover*** (days) versus ***Pixel size*** (meters/kilometers) are plotted, how satellites like say, sun-synchronous and geostationary satellites get disributed? Draw figure and explain?

12. How integrated exploration may be useful in hydrocarbon deposits?

13. Statement: Radiometric methods are geophysical oddities……. Justify?

14. Among Sesimic, Gravity and Magnetic methods, what are the operative physical property(ies)?

15. It is well understood that the capital cost for analysis using Calorimetry, Atomic Absorption Spectrometry, X-ray flourescence, ICP-ES and ICP-MS varies in the order of $ X to $ 130X. Comment on samples for which these methods are useful?

16. Show typical geological objects with differing dimensions?

17. Comment on exploration for gemstones?

18. How Drift – Scale – Tilt – Yaw are the issues in aerial photography?

19. Statement: The chemical properties of REEs depend not only on their atomic structure, but also on their size. If so, what are the advantages?

20. Show how precision and accuracy assuming normal distribution of analytical error may schematically be represented?

SECTION: C

Questions from 21 to 22 carry 10 (*ten*) marks each. Answer both of them? (2 × 10 = 20)

21. What is the problem of ambiguity in geophysical exploration? (10)

22. How your learnings from the previous courses, ArcGIS, may be useful in mineral exploration? (10)