

## M.Sc. Sem.-4 Examination

508

Geology

April-2025

Time : 2-30 Hours]

[Max. Marks : 70

**Instructions:** (i) Draw neat diagrams whenever necessary.  
(ii) Write proper answer number.

Q-1. Describe principles of terrain evaluation and environmental monitoring of engineering projects of India. (14)

OR

Q-1. (a) Explain the concept of lateral loads in the seismic design of buildings. (07)

(b) Explain influence of geological conditions on foundation and design of buildings. (07)

Q-2. Write an illustrative account on environmental impact assessment of engineering projects with case histories from Gujarat. (14)

OR

Q-2. (a) Geotechnical studies of dam and reservoirs. (07)

(b) Rock mass improvement techniques. (07)

Q-3. Explain deep - sea mining in India with reference to history and contract with ISA. (14)

OR

Q-3. (a) Write an explanatory note on trenches and canyons. (07)

(b) Discuss oceanic sediments and distribution of marine microfossils. (07)

Q-4. i. The results of a national survey showed that on average, adults sleep 6.9 hours per night. Suppose that the standard deviation is 1.2 hours. Use Chebyshev's theorem to calculate the percentage of individuals who sleep between 4.5 and 9.3 hours and between 3.9 and 9.9 hours. (14)

ii. The cost of consumer purchases such as single-family housing, gasoline, Internet services, tax preparation, and hospitalization were provided below. Sample data typical of the cost of tax-return preparation by services such as H&R Block are shown below.

120, 230, 110, 115, 160, 130, 150, 105, 195, 155, 105, 360, 120, 120, 140, 100, 115, 180, 235, 255,

Compute the mean, median, mode, variance and standard deviation.

OR

Q-4. (a) Find the integral  $\int_0^{\pi} (5\sin x + 4x^2 + \cos x) dx$  and  $\int_0^{\pi} (\tan x + 4x^{1/2} + \cos x) dx$  (07)  
also find derivative of  $y = 3x^2 \sin x$  at  $x = \pi$

(b) Find the integration the following: (07)

(i)  $w = 7e^z$ , with respect to  $z$  from 0 to 1.

(ii)  $\alpha = 10 \sin \theta + 13 \cos \theta$ , with respect to  $\theta$  from 0 to  $\frac{\pi}{2}$ .

(P.T.O)

**Q-5. Answer any seven short questions out of twelve.**

- (i) Mention the category and name three localities which are in Highest Damage Risk Zone with reference to seismicity.
  - (ii) Define liquefaction with example.
  - (iii) What are the geological considerations involved in the construction of buildings?
  - (iv) Draw a figure showing relation between folding parallel to tunnel.
  - (v) What are the key principles of New Austrian Tunnelling Method?
  - (vi) Define Sea mounts with suitable examples.
  - (vii) Mention two deep sea/ocean topographic features with examples.
  - (viii) What you know about NIOT?
  - (ix) What is Prithvi Vigyan Scheme?
  - (x) Find the derivative of the  $y = x^2 e^x$  at given point  $x = 1$ .
  - (xi) Define Null and Alternative hypothesis.
  - (xii) Find the differentiation of  $x^3$ .
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