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1413. The main type of modulation are frequently used in electronic distance measurement
a. amplitude modulation
b. frequency modulation
c. phase modulation
d. laser modulation
e. microwave modulation
(a) a, b and c*
(b) a, b and d
(c) b, c and e
(d) b, c and d
(e) a, b and e
(DGMS FCMC/METAL/R/DEC 2021)

1414. Pick up the correct statement
(a) the prismoidal correction is always positive
(b) if the mass haul diagram rises, it shows filling
(c) the curvature between a minimum point on the mass -haul diagram and the next maximum point is equal to the volume of the cutting*
(d) the curvature correction is positive when the eccentricity is on the inside of the curve
(e) the curvature correction is negative when the eccentricity is on the inside of the curve
(DGMS FCMC/METAL/R/DEC 2021)

1415. On a vertical photograph the relief displacement is always radial form
(a) principal point*
(b) isocentre
(c) nadir point
(d) homologous points
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1416. A back sight reading on B.M. = 100m was 3.250 m. The inverted staff reading to the bottom of a girder was 1.250 m. The R.L. of the bottom girder is
(a) 101.250 m
(b) 102.0 m
(c) 104.40 m*
(d) 103.25 m
(e) 10.250 m
(DGMS FCMC/METAL/R/DEC 2021)

1417. Two haul roads having a deviation angle of 45°48' are to be joined by a 180 m radius curve. Find the length of the tangent.
(a) 56.12 m
(b) 89.45 m
(c) 160.22 m
(d) 76.03 m*
(e) 44.66 m
(DGMS FCMC/METAL/R/DEC 2021)

1418. What types of methods are used for orientation of plane table?
(a) fore sighting
(b) back sighting
(c) magnetic needle method
(a) only (a)
(b) only (b)
(c) only (c)
(d) both (a) and (c) *
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1419. The side overlap of a stereo pair of photography is usually
(a) 60%
(b) 50%
(c) 4O%
(d) 30%*
(e) 45%
(DGMS FCMC/METAL/R/DEC 2021)

1420. When a star is on the prime vertical, the hour angle H is given by
(a) $\cos^{-1}(\tan\delta.\tan\theta)$
(b) $\cos^{-1}(\tan\delta.\cot\theta)$ *
(c) $\cos^{-1}(\cot\delta.\tan\theta)$
(d) $\cos^{-1}(\sin\delta.\cos\theta)$
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1421. Geodetic surveying involves
(a) Triangulation
(b) Precise levelling
(c) Tacheometry
(d) Corrections due to curvature of the earth
(a) (a) (b) and (c)
(b) (a) (b) and (d) *
(c) (a) (c) and (d)
(d) (a) (b) (c) (d)
(e) (b) (c) and (d)

(DGMS FCMC/METAL/R/DEC 2021)

1422. The great circle on the celestial sphere which the sun appears to describe with the earth as a centre in the course of a year is called ——
(a) The ecliptic*
(b) The Celestial equator
(c) The Terrestrial equator
(d) The visible horizon
(e) None of these
(DGMS FCMC/METAL/R/DEC 2021)

1423. The co-efficient of linear expansion of invar as compared to that of ordinary steel is about
(a) 1/500
(b) 1/100
(c) 1/30*
(d) 1/200
(e) 1/50
(DGMS FCMC/METAL/R/DEC 2021)

1424. Select the incorrect statement
(a) The relief displacement increases with an increase in the elevation of the object
(b) The scale of a vertical photograph is inversely proportional to to the flying height above the datum
(c) drift is the lateral shifting of photograph without any inclination
(d) The relief displacement is zero for the image at the nadir point n of the photograph
(e) photomaps and mosaics are true plan metric representations of the area*
(DGMS FCMC/METAL/R/DEC 2021)

1425. The perspective and orthographic projections produce similar image on a
(a) vertical photograph*
(b) tilted photograph
(c) high oblique photograph
(d) low oblique photograph
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1426. The correction for temperature for the measurement of a base line depends on
(a) the difference of temperature at the time of measurement and the standardisation temperature
(b) the co-efficient of thermal expansion of the material of the tape
(c) The Young's modulus of elasticity of the tape
(a) (a) and (b) are correct*
(b) (a) and (c) are correct
(c) (b) and (c) are correct
(d) (a), (b) and (c) are correct
(e) none of the above
(DGMS FCMC/METAL/R/DEC 2021)

1427. Which of the following is the correct statement in a prismatic compass
(a) Zero is placed at N end
(b) The least count is 20"
(c) Least count is 20'
(d) The graduations are inverted*
(e) it indicate quadrantal bearing
(DGMS FCMC/METAL/R/DEC 2021)

1428. Vertical photographs do not represent the true plan of the ground because of
(a) variation in speed of aircraft
(b) ground relief*
(c) tilt displacement
(d) image displacement
(e) all of these
(DGMS FCMC/METAL/R/DEC 2021)

1429. One link means the distance from
(a) centre to centre of middle rings
(b) centre to centre of inner rings
(c) centre to centre of outer rings
(a) only (a) *
(b) only (b)
(c) only (c)
(d) both (a) and (b)
(e) all of these
(DGMS FCMC/METAL/R/DEC 2021)

1430. Which of the following are true for geodetic surveying?
(a) Geodetic surveying may be carried out by triangulation.
(b) Geodetic surveying may be carried out by precise traversing.
(c) Precise traversing is more accurate than triangulation.
(d) Triangulation is more accurate than precise surveying.
(a) (a) (b) and (c) only

(b) (b) and (d) only
(c) (a) (b) and (d) only*
(d) (a) and (c) only
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1431. Concept associated with the representation of vector data differently at different scales are
(a) cartographic generalization
(b) cartographic symbolization
(c) unique feature identifier*
(d) topological data model
(e) both 1 and 2
(DGMS FCMC/METAL/R/DEC 2021)

1432. The scale of vertical photographs of a flat terrain , with a variation in the flying altitude will be
(a) uniform
(b) non-uniform*
(c) uniform, if tilt is not there
(d) non-uniform, if tilt is not there
(e) all of these
(DGMS FCMC/METAL/R/DEC 2021)

1433. A road section of a length 1 km scales 8 cm on a vertical photograph. The focal length of the camera is 160 mm. If the terrain is fairly level, then the flying height will be
(a) 1000 m
(b) 2000 m*
(c) 3000 m
(d) 4000 m
(e) 5000 m
(DGMS FCMC/METAL/R/DEC 2021)

1434. The magnetic bearing of sun at noon is 170 degree. The magnetic declination at the place is
(a) 10 degree W
(b) 10 degree E*
(c) 10 degree N
(d) 10 degrees
(e) 170 degree
(DGMS FCMC/METAL/R/DEC 2021)

1435. Which are the fundamental lines of a levelling instrument.
(a) line of collimation
(b) axis of telescope
(c) axis of bubble tube
(d) vertical axis
(a) only (a)
(b) only (b)
(c) only (c) and (d)
(d) only (a), (b) and (c)
(e) all of these*
(DGMS FCMC/METAL/R/DEC 2021)

1436. Ground control points are established in aerial photogrammetry to control
(a) height distortion
(b) tilt distortion
(c) relief displacement
(d) scale*
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1437. A star is said to be at elongation if __
(a) Its rays appear elongated.
(b) It is farthest from the pole star
(c) It is at its greatest distance east or west of the meridian*
(d) It is farthest from the observer 's meridian
(e) It is farthest from the first point of aries
(DGMS FCMC/METAL/R/DEC 2021)

1438. The observer's meridian is the great circle which passes through the ——
(a) Heavenly body
(b) Zenith and Nadir
(c) Celestial poles
(d) Zenith, nadir and celestial poles*
(e) Zenith, Nadir and Heavenly body
(DGMS FCMC/METAL/R/DEC 2021)

1439. If a 20m chain diverges a perpendicular distance of 2m from its correct alignment , the error in length is
(a) +0.10 m*
(b) -0.10 m
(c) +0.20 m
D)-0.20 m
(e) -0.02 m
(DGMS FCMC/METAL/R/DEC 2021)

1440. If y/2 is the semi -diameter of the sun, the correction to the observed horizontal angle is

(a) y/2
(b) (y/2)tanα
(c) (y/2)secα*
(d) (y/2) cosα
(e) (y/2)sinα
(DGMS FCMC/METAL/R/DEC 2021)

1441. Precautions to be taken while shifting a prismatic compass from one station to another is/are
(a) sight vane must be folded
(b) prism must be removed
(c) direction of sight must be maintained
(a) only (a) *
(b) only (b)
(c) only (c)
(d) (a), (b) and (c)
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1442. Local attraction' can be developed due to presence of
(a) steel structures
(b) iron ore
(c) electric cables conveying current
(d) copper ore
(a) only (a)
(b) only (b)
(c) only (c)
(d) (a), (b) and (c) *
(e) (a), (b) (c) and (d)
(DGMS FCMC/METAL/R/DEC 2021)

1443. A survey line was measured with a 20 m chain on a slope of 600 and found to be 12 chains. Later, however, it was found that the chain was 0.5 link too short. What is the true length of the line?
(a) 6.03 chains
(b) 10.34 chains
(c) 5.97 chains*
(d) 10.44 chains
(e) 20.68 chains
(DGMS FCMC/METAL/R/DEC 2021)

1444. Given the Whole Circle Bearing (WC(b) of a line AB is equal to 320° 30', find the WCB of the line BA.
(a) 320° 30'
(b) 140° 30'
(c) N 320° 30' E
(d) S 140° 30' W
(a) only (a)
(b) only (b) *
(c) Only (a) and (c)
(d) Only (b) and (d)
(e) all of these
(DGMS FCMC/METAL/R/DEC 2021)

1445. The bearings of two traverse legs AB and BC are $N50^0$ 30' E and $N20^0$ 15' E respectively. The deflection angle is ——
(a) 30^0 15' L*
(b) 30^0 15' W
(c) 30^0 15' N
(d) 30^0 15' S
(e) $30^0$15' E
(DGMS FCMC/METAL/R/DEC 2021)

1446. Pick up the incorrect statement from the following ——
(a) The straight distance between end points of a suspended tape is reduced by an amount called the sag correction
(b) a 100 m tape is of cross section 10mm into 0.25 mm that stretches about 10mm under 5 Kg pull
(c) while measuring a distance with a tape of length 100.005 m, the distance is to be increased by 0.005 m for each tape length
(d) an increase in temperature causes a tape to increase in length and measured distance is too large*
(e) none of these
(DGMS FCMC/METAL/R/DEC 2021)

1447. Which of the following are correct about the law of accidental errors
(a) it is represented by the curve of error or probability curve
(b) small errors are more probable
(c) large errors occur infrequently and are nearly impossible
(d) positive and negative errors of same size occur with equal frequency and are equally probable
(a) only (a), (b), and (d) are correct
(b) only (b), (c), and (d) are correct
(c) only (a), (b), and (c) are correct
(d) only (a) and (d) are correct
(e) (a), (b), (c), and (d) are correct *
(DGMS FCMC/METAL/R/DEC 2021)

1448. The fore bearing of a line AB is 209 degree, the included angle ABC is 341 degree. The FB of line BC is
(a) 550 degree
(b) 330 degree
(c) 510 degree
(d) 10 degree*
(e) 190 degree
(DGMS FCMC/METAL/R/DEC 2021)

1449. The distance on arc of the great circle corresponding to angle of one minute subtended by the arc at the centre of the earth is equal to ——
(a) one nautical mile*
(b) one kilometre
(c) one mile
(d) one furlong
(e) 1.672 km
(DGMS FCMC/METAL/R/DEC 2021)

QUESTIONS FROM GATE EXAMS

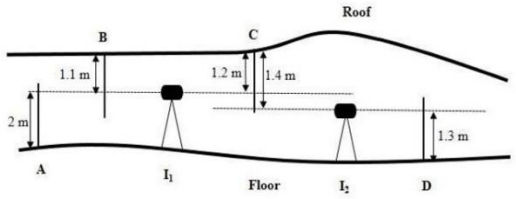
1450. In an astronomical survey at a given station, the pole star is located at an angle of 27° from the horizon. The latitude of the survey station in degrees is
(a) 27° N*
(b) 63° N
(c) 27° S
(d) 63° S (GATE 2023)
Answer: The angle between the Pole star and the horizon is 27° and that is the latitude.

1451. The position tracking of a point by GPS is based on the technique of
(a) Graphical resection.
(b) Analytical resection.
(c) Triangulation.
(d) Trilateration* (GATE 2023)

1452. Coordinate of two points A and B are (E 0 m, N 200 m) and (E 300 m, N 200 m), respectively. The bearing of two lines AO and BO are 67° and 35°, respectively. The easting of point O, in m, is _____. (GATE 2023)
Answer: 426.00 to 427.64

1453. The following consecutive readings were taken at uniform interval with a level and a levelling staff on continuously sloping ground.
0.405, 1.035, 1.654, 0.240, 0.615, 1.125, 0.800, 1.125
The number of change points is ____
(GATE 2020)
Answer: 2
First change point: A drop from 1.654 to 0.240
Second change point: A drop from 1.125 to 0.800

1454. The following figure represents the observations from the level survey of an underground gallery.



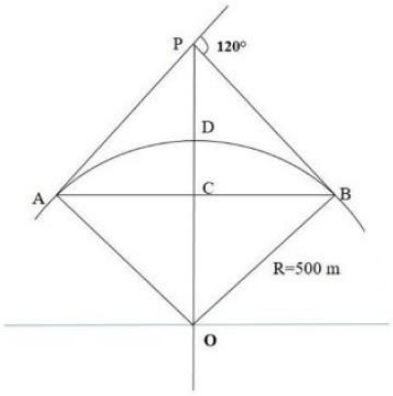
If the reduced level of station A is 100.0 m. the reduced level of station D in m is ____.
(GATE 2020)
Answer: 100.4 to 100.6
Solution: RL = 100 + 2 -(1.4 - 1.2) - 1.3
= 101.5 m

1455. A tacheometer was setup at station P and the following readings were taken at two stations A and B with the staff held vertical and the line of sight horizontal.

Line	Bearing	Staff intercept
PA	210^0	1.2 m
PB	135^0	1.4 m

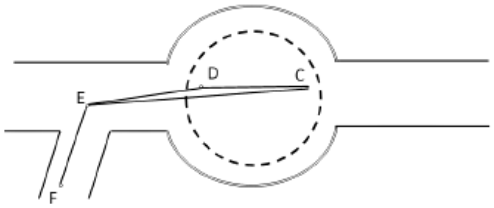
The additive and multiplying constants of the tacheometer are 0 and 100, respectively. The length of AB in m is ____
(GATE 2020)
Answer: 157.0 to 161.0

1456. The geometry of a simple planar curve (ADB) is shown below. The value of the; mid-ordinate of the curve in m is ____.
(GATE 2020)



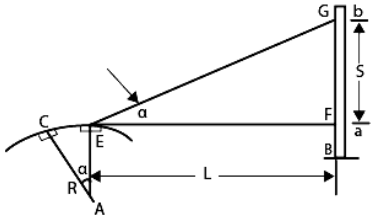
Solution: Mid ordinate = R[1 - cos(Δ/2)]
= 500[1 - cos(120/2)]
= 250 m

1457. The pit bottom in a correlation survey is shown in the figure.



Points C and D represent two suspended wires. The bearing of line CD is $286^0 00'00''$ and its
length is 4.64 m. The angle CED is measured as $00^0 00'40''$. The length of line DE is 5.46 m. Considering the Weisbach triangle method, the bearing of the line CE is
(a) 286°00'47"
(b) 285°59'12.9"*
(c) 286°00'40"
(d) 285°00'47.1" (GATE 2021)

1458. For a dumpy level, the bubble tube has sensitivity of 40" for one division. While taking a staff reading at a distance of 60 m, the bubble is out of centre by 2 divisions. The error in staff reading in mm is_____. (GATE 2021)
Solution: Sensitivity, ϕ = 40" per 1 division
Distance between staff and instrument, L = 60 m
Deviation of bubble from center, n= 2
Find, error in staff reading, S =?
See figure.



Sensitivity formula is
φ = 206265 x S/(L x n)
∴ 40 = 206265 x S/(60 x 2)
∴ S = 0.0232 m = 23.2 mm

1459. On an old plan of scale 1:1000, leasehold area of a mine is now measured as 802 cm^2 using a planimeter. The plan is found to have shrunk, such that the original line of 10 cm is now measured as 9.8 cm on the plan. True lease hold mine area, in m^2, is _____. (GATE 2021)
Solution: SF = 9.8/10 = 0.98
As the plan is shrunk, we will get more plan area.
Plan area = 802 /$(0.98)^2$ = 835.07 cm^2
On scale of 1/1000, it will be 835.07 x 1000^2 cm^2 = 83507 m^2

1460. In a levelling survey, a reading is taken as 2.25 m. However, along the line of sight there is deflection of 20 cm with respect to vertical position of the staff. The correct reading, in m is_____.
(GATE 2022)

1461. In a levelling survey, a reading is taken as 2.25 m. However, along the line of sight there is deflection of 20 cm with respect to vertical position of the staff. The correct
reading, in m is_____. (GATE 2022)
Solution: See figure.