

Hall Ticket No

Question Paper Code: ACEB01



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

## MODEL QUESTION PAPER

B.Tech III Semester End Examinations, November- 2019

Regulations: R18

**SURVEYING & GEOMATICS**

(CIVIL ENGINEERING)

**Time: 3 hours**

**Max. Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

### MODULE- I

1. a) To find out the included angles in a closed traverse PQRSTP, the following observations were made with compass. Calculate the included angles after correcting for local attractions [7M]

Line	FB	BB
PQ	N 62°45'E	S 62°15'W
QR	N 21°00'E	S 20°45'W
RS	N71°30'W	S 71°30'E
ST	S 39°00'W	N 38°00'E
TP	S 54°30'E	N 53°15'W

- b) The following perpendicular offsets were taken at 10m intervals from a survey line to an irregular boundary line 3.25,5.60,4.20,6.65,8.75,6.20,3.25,4.20,5.65 calculate the area enclosed between the survey line , the irregular boundary line and the first and last offsets, by the application of [7M]
- i) Trapezoidal rule and
  - ii) Simpson's rule
2. a) The following staff readings were obtained during a leveling work with the instrument being shifted after the 4<sup>th</sup>, 7<sup>th</sup> and 9<sup>th</sup>. Readings: 2.305, 0.940, 0.865, 1.325, 2.905, 1.185, 1.205, 2.015, 1.365, 0.985 and 1.785. Find the reduced levels of the remaining points if the Reduced level at first point is 100.000m. [7M]
- b) Determine the area of the closed traverse ABCDA by the M.D. method [7M]

Line	Latitude	Departure
AB	+108	+4
BC	+15	+249
CD	-123	+4
DA	0	-257

## MODULE – II

3. a) Two straights intersect at chainage 2056.44m and the angle of intersection is  $120^\circ$ . If the radius of the simple curve to be introduced is 600m find the following tangent distance and length of long chord [7M]
- b) Two roads meet at an angle of  $127^\circ 30'$ . Calculate the necessary data for setting out a curve of 15 chains radius to connect the two straight points of the road if it is intended to set the curve by chain and offsets only. Explain carefully how you would set out the curve in the field. Assume the length of chain as 20m. solve using Radial offsets method [7M]
4. a) Two roads meet at an angle of  $127^\circ 30'$ . Calculate the necessary data for setting out a curve of 15 chains radius to connect the two straight points of the road if it is intended to set the curve by chain and offsets only. Explain carefully how you would set out the curve in the field. Assume the length of chain as 20m. solve using perpendicular offsets method [7M]
- b) Discuss the method of setting out a circular curve with two theodolites. What are its advantages and disadvantages over Rankine's method [7M]

## MODULE – III

5. a) What are the applications of total station in civil engineering? Discuss merits and demerits of total station survey. [7M]
- b) What are the components of total station? Discuss the disadvantages of total station in detail? [7M]
6. a) What are the applications of Global Positioning System in civil engineering? Discuss about space and user segments. [7M]
- b) Discuss about Global Positioning System and list out the segments of Global Positioning System in detail. [7M]

## MODULE – IV

7. a) Vertical photographs were taken from a height of 3500m above the terrain with a camera of 15cm focal length. Calculate the scale of photography. [7M]
- b) The distance of an image of a triangulation station 250m above mean sea level from the principal point is 3.20cm. calculate the height displacement if the flying height of the camera is 2000. [7M]
8. a) A camera having a focal length of 200mm is to be used to take a vertical photograph of a terrain having an average elevation of 2000m at what height above datum the aircraft should fly to have photograph at a scale of 1:5000? [7M]
- b) Discuss in detail and derive an equation how the height of an object on the terrain can be determined using stereo parallax measurements. [7M]

## MODULE – V

9. a) Describe the difference between active and passive remote sensing and explain about the energy sources used. [7M]
- b) Explain about two energy sources available for earth passive remote sensing and elucidate with their spectral characteristic curves. [7M]
10. a) Describe the Electromagnetic spectrum, with emphasis on optical visible spectral bands. [7M]
- b) Discuss on the elements or processes involved in earth remote sensing with a neat diagram. [7M]



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## COURSE OBJECTIVES:

The course should enable the students to:

I	Describe the function of surveying in civil engineering construction.
II	Work with survey observations, and perform calculations.
III	Identify and calculate the errors in measurements and to develop corrected values for differential level circuits, horizontal distances and angles for open or closed-loop traverses.
IV	Operate an automatic level to perform differential and profile leveling properly record notes mathematically reduce and check levelling measurements

## COURSE OUTCOMES (COs):

CO 1	Explore the importance of Linear, angular and graphical methods involved in surveying to make a plan or map
CO 2	Understand various method of curve setting and Elements of curves at various locations.
CO 3	Analyze Co-ordinate transformation and accuracy considerations with GPS
CO 4	Analyze photographic mapping, mapping using paper prints, stereo plotting instruments, mosaics and map substitutes
CO 5	Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface.

## COURSE LEARNING OUTCOMES (CLOs):

ACEB01.01	Analyze the sources of errors in linear measurements.
ACEB01.02	Obtain the direction of a surveying line with a prismatic and surveyors compass
ACEB01.03	Explain the importance of theodolite and understand the principle of measuring angles in horizontal and vertical plains.
ACEB01.04	Draw cross section and prepare a contour maps for road works, rail works, canals etc.,
ACEB01.05	Draw and calculate the area enclosed with in the traverse.
ACEB01.06	Use Elements of simple, reverse, transition and compound curves at suitable locations
ACEB01.07	Understand the Method of setting out simple curves, compound curves and reverse curves etc.,
ACEB01.08	Calculate length of curve using various methods
ACEB01.09	Analyze geometric design of vertical curve at suitable location.
ACEB01.10	Understand the basic Principle of Electronic Distance Measurement
ACEB01.11	Understand different types of EDM instruments such as Distomat, and Total Station.
ACEB01.12	Summarize the Advantages and Applications Total Station

ACEB01.13	Understand Field Procedure for total station survey and Errors in Total Station Survey.
ACEB01.14	Differentiate the advantages of global positioning system and geographical information system.
ACEB01.15	Analyze Co-ordinate transformation and accuracy considerations with GPS.
ACEB01.16	Understand the basic concepts involved in Photogrammetric surveying.
ACEB01.17	Understand perspective geometry of aerial photograph.
ACEB01.18	Analyze relief and tilt displacements using aerial photogrammetric surveying.
ACEB01.19	Explain terrestrial photogrammetry, flight planning, Stereoscopy, ground control extension for photographic mapping by aerial triangulation and radial triangulation methods.
ACEB01.20	Analyze photographic mapping, mapping using paper prints, stereo plotting instruments, mosaics and map substitutes
ACEB01.21	Understand the basic concept of Electromagnetic Spectrum.
ACEB01.22	Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface.
ACEB01.23	Analyze remote sensing data acquisition on platforms and sensors.
ACEB01.24	Analyze visual image interpretation and digital image processing techniques.

#### MAPPING OF SEMESTER END EXAMINATION - COURSE OUTCOMES

SEE Question No	Course Learning Outcomes		Course Outcomes	Blooms Taxonomy Level	
1	a	ACEB01.02	Obtain the direction of a surveying line with a prismatic and surveyors compass	CO 1	Understand
	b	ACEB01.03	Explain the importance of theodolite and understand the principle of measuring angles in horizontal and vertical plains.	CO 1	Remember
2	a	ACEB01.04	Draw cross section and prepare a contour maps for road works, rail works, canals etc.,	CO 1	Understand
	b	ACEB01.05	Draw and calculate the area enclosed within the traverse.	CO 1	Understand
3	a	ACEB01.06	Use Elements of simple, reverse, transition and compound curves at suitable locations	CO 2	Understand
	b	ACEB01.07	Understand the Method of setting out simple curves, compound curves and reverse curves etc.,	CO 2	Remember
4	a	ACEB01.08	Calculate length of curve using various methods	CO 2	Understand
	b	ACEB01.09	Analyze geometric design of vertical curve at suitable location.	CO 2	Understand
5	a	ACEB01.13	Calculate the correlation coefficient to the given data.	CO 3	Remember
	b	ACEB01.15	Calculate the regression to the given data.	CO 3	Understand
6	a	ACEB01.15	Calculate the regression to the given data.	CO 3	Remember
	b	ACEB01.11	Understand different types of EDM instruments such as Distomat, and Total Station.	CO 3	Understand
7	a	ACEB01.12	Summarize the Advantages and Applications Total Station	CO 4	Remember
	b	ACEB01.13	Understand Field Procedure for total station survey and Errors in Total Station Survey.	CO 4	Understand

8	a	ACEB01.14	Differentiate the advantages of global positioning system and geographical information system.	CO 4	Remember
	b	ACEB01.19	Explain terrestrial photogrammetry, flight planning, Stereoscopy, ground control extension for photographic mapping by aerial triangulation and radial triangulation methods.	CO 4	Understand
9	a	ACEB01.21	Understand the basic concept of Electromagnetic Spectrum.	CO 5	Understand
	b	ACEB01.22	Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface.	CO 5	Remember
10	a	ACEB01.23	Analyze remote sensing data acquisition on platforms and sensors.	CO 5	Understand
	b	ACEB01.24	Analyze visual image interpretation and digital image processing techniques.	CO 5	Remember

**Signature of Course Coordinator**

**HOD, CE**