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) The fore and back bearings of the lines of a traverse are given below. Correct the bearings and check the geometrical condition of interior angles **[7M]**

Line	Fore Bearing	Back Bearing
AB	$610^0 12'$	$241^012'$
BC	$153^024'$	$333^024'$
CD	$201^002'$	$210^0 02'$
DA	$280^014'$	$100^014'$
EA	$200^0 30'$	$200^020'$

b) The following perpendicular offsets were taken from a chain line to a hedge. Compute the area included between the chain line, the hedge and offset by Trapezoidal rule **[7M]**

Chainage	0	15	30	45	60	70	80	100	120	140
offset	7.60	8.5	10.7	12.8	10.6	9.5	8.3	7.9	6.4	4.4

2. a) Derive the equation for heights and distances using trigonometric leveling When bases are accessible and inaccessible. **[7M]**

b) Determine the area of the closed traverse ABCDA by Co- ordinate method. **[7M]**

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

MODULE – II

3. a) What are the elements of simple circular curve? Discuss the terminology with neat sketch and give their relationship **[7M]**

    b) Two roads meet at an angle of 127^{u} 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) Describe the procedure of setting out of simple circular curve by Perpendicular offset from tangent. **[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) Discuss the preventive measures to eliminate errors in total station survey and differentiate between Remote distance measurement method and Remote elevation measurement methods. **[7M]**

    b) Discuss in detail about the field procedure calculate an area of field using total station survey **[7M]**

6. a) What are the applications of Global Positioning System in civil engineering? Discuss about space and user segments. **[7M]**

    b) Write a note on Co-ordinate transformation and accuracy consideration in 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) What is Relief Displacement? Discus the exists because photos are a perspective projection. Explain how can this be used to determine the height of an object on the terrain? **[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 element of 2000m at what height above datum the aircraft should fly to have photograph at a scale of 1:5000? **[7M]**

    b) The distance of an image of a triangulation station 250m above mean sea level from the principal point is3.20cm. calculate the height displacement if the flying height of the camera is 2000 **[7M]**

MODULE – V

9. a) Discuss the interaction of Electromagnetic Radiation with the Earth's atmosphere using various scattering mechanism. **[7M]**

    b) Scrutinize the various applications and advantages of aerial and satellite remote sensing system in the field of civil engineering. **[7M]**

10. a) What are the visual image interpretation elements in Remote Sensing? How it is applicable in civil engineering? **[7M]**

    b) Discuss on the elements or processes involved in earth remote sensing with a neat diagram. **[7M]**

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	Analyse 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	Remember
	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	Remember
6	a	ACEB01.15	Calculate the regression to the given data.	CO 3	Understand
	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	Remember
	b	ACEB01.22	Summarize the concept of interaction of electromagnetic radiation with the atmosphere and earth surface.	CO 5	Understand
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	Understand

Signature of Course Coordinator   **HOD, CE**