

# TECHNICAL DRAWING

## SCHEME OF EXAMINATION

The examination shall consist of three papers, Papers 1, 2 and 3; all of which must be taken. Papers 1 and 2 shall composite and shall be taken at one sitting.

**Paper 1:** This shall consist of forty compulsory multiple choice objective questions for 40 marks and will last for 1 hour. The paper will be in two sections, Sections A and B.

Section A will contain Questions 1 to 30 and will be on the general principles, techniques and uses of plane and solid geometry aspects of the syllabus.

Section B will be in two parts, Part I on Building Drawing and Part II on Mechanical Drawing. Each part will contain ten questions, Questions 31 to 40. Candidates may answer questions in one part only.

**Paper 2:** This shall consist of five essay questions on plane, solid and vector geometry out of which candidates shall be required to answer three questions only within 1¾ hours for 60 marks.

**Paper 3:** This shall consist of two sections, Sections A and B which will last for 2¾ hours and carry 100 marks.

Section A shall consist of a compulsory question and others requiring sketches of objects, components, symbols and tools used in the Building and Mechanical industries. Candidates shall be required to answer the compulsory question for 20 marks and one of the other questions for 10 marks, making a total of 30 marks. The section will last for 45 minutes.

Section B shall consist of two questions, one on Building Drawing and the other on Mechanical Drawing. Candidates will be required to answer either of the two questions in 2 hours for 70 marks.

## DETAILED SYLLABUS

### PLANE GEOMETRY

S/NO.	CONTENTS	NOTES
1	Drawing materials and equipment, types of drawing and applications	Standard size drawing A2 ISO board and drawing sheet, set squares, drawing instruments, protractor and T-square.

2	Lines, lettering and dimensioning	Types of lines and their uses. Types and styles of lettering, title blocks and border lines. These should conform to BS 1192 and BS 308A.
3	Division of lines and its applications	Dividing into a given number of equal parts or proportion and other simple exercises involving mathematical problems.
4	Scales and their uses	Plain and diagonal scales, constructions and their applications, including scale of chords.
5	Angles	Types and their constructions.
6	Triangles, quadrilaterals and other polygons	Regular and irregular polygons: properties and their constructions.
7	Circles	Parts, types, properties and their constructions.
8	Tangents and tangency	Construction and application of principles of tangency to spanner, anchors and other tools.
9	Inscribed, circumscribed and escribed figures	Definitions, identification and their constructions.
10	Similar figures and areas	Enlargement and reduction by area and side.
11	Loci	Definition and construction of straight line, circle, ellipse, parabola, hyperbola, helix, trochoids (inferior and superior) spiral, cycloid, hypocycloid, involutes and link mechanisms.
<b>SOLID GEOMETRY</b>		
12	Lines in space and planes	Location of points and lines in space. True length and angle of inclination of a line. Intersecting lines, plane relationships and traces. Types of planes and edge views of planes.
13	Pictorial drawing: isometric, oblique, perspective	Isometric scales and circles, oblique scales and curves. One and two points perspective, including free hand sketching.
14	Orthographic projection	Multiplane, 1st and 3 <sup>rd</sup> angle projection.
15	Auxiliary projections	Prisms, cones, cylinder, cube, pyramid (right and oblique), including second auxiliary projection.
16	Sectional views and true shapes	True shape of sections of prisms, cylinders pyramids and cones, (ellipse, parabola, hyperbola, circle and triangle).
17	Development of surfaces	Surfaces of right and oblique pyramids, prisms, cylinders, cones and their truncated parts and frustum .Transition pieces.
18	Intersection /Interpenetration	Intersections of cylinders, cones, prisms and pyramids.

### SYMBOLS AND CONVENTIONS

19	Symbols and conventions used in plane and solid geometry	Example, the symbol used to indicate the diameter of a circle.
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### VECTOR GEOMETRY

S/N	CONTENTS	NOTES
20	Forces: co-planer, con-current and parallel	Graphical determination of resultant, using Bow's notation. Equilibrant and reaction using triangle and polygon of forces.
21	Simple framed structure	Determination of reactions and internal forces of members and nature of forces.
22	Shearing force and bending moment diagrams	Simple supported beams and cantilevers with concentrated and uniformly distributed loads.
23	Centre of gravity of lamina	Simple geometrical shapes.

NOTE: Vector Geometry is for candidates in Ghana only and will be examined in Paper 2.

### BUILDING DRAWING

The recommendations of the current BS 1192 (metric) should be followed.

S/NO.	CONTENT	NOTES
1	Freehand sketching and identification of building tools	Both pictorial and orthographic sketches of building tools.
2	Foundations and Floors	Types and parts of foundations and floors.
3	Openings – windows, doors and arches	Types and parts of doors, windows and arches.
4	Stairs and staircases	Parts and types of staircases.
5	Roofs	Types and parts of roofs.
6	Constructional details of parts of buildings	Includes wall, column, beam, lintel, etc.
7	Working drawings of buildings	Orthographic projections and sectional views.
8	Building materials, freehand sketching, symbols and conventions	Including electrical and plumbing fittings.

### MECHANICAL DRAWING

The recommendations of the current BS 308A (metric) should be followed.

S/NO.	CONTENT	NOTES
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1	Freehand sketching and identification of mechanical tools	Both pictorial and orthographic sketches of mechanical tools.
2	Dimensioning	Limits and fits, allowances, tolerances; emphasis on correct techniques.
3	Screw threads, fasteners and locking devices	Include conventional representation, construction and their applications.
4	Sectioning	Full, half-part, offset, broken, removed, aligned and revolved.
5	Pictorial drawing	Isometric and oblique drawing; including freehand sketching.
6	Working and assembly drawing.	Orthographic and sectional views.
7	Symbols, conventions and abbreviations	Include electrical and plumbing fittings and welding symbols.

### LIST OF RECOMMENDED TEXTBOOKS

S/N	TEXT BOOKS	AUTHORS	PUBLISHERS
1	TECHNICAL DRAWING FOR SCHOOL CERTIFICATE AND G.C.E (Metric Edition)	J.N GREEN	SPECTRUM BOOKS
2	ENGINEERING DRAWING with worked examples 1 & 2 (3 <sup>rd</sup> edition)	M.A PARKER AND F.PICKUP	NELSON THORNS LTD
3	GEOMETRIC AND ENGINEERING DRAWING	K.MORLING	
4	GEOMETRIC AND TECHNICAL DRAWING	A.YARWOOD	ELBS with NELSON
5	FOUNDATION OF TECHNICAL DRAWING	A.PARKISON	
6	TECHNICAL DRAWING with Mechanical Engineering & Drawing option	W.E.KUDOR	