

**N.R.C.D.326**

**WEIGHTS AND MEASURES ACT, 1975**

ARRANGEMENT OF SECTIONS

*Units of Measurement*

SECTION

1. International System of Units.
2. Measurements in International System of Units.
3. Primary standards.
4. Secondary standards.
5. Tertiary standards.
6. Working standards.
7. Verification of standards.
8. Keeping of standards.

*Weights and Measures for Trade and Industry*

9. Weights and measures for use in trade and industry.
10. Denominations of weights and measures.
- II. Stamping, verification and issue of certificates.
12. . Lead, pewter and iron weights.
13. Mode of filling measures of capacity.

*Administration*

14. Custodian of Weights and Measures.
15. Inspectors of Weights and Measures.
16. Duties of Inspectors.
17. Powers of entry and seizure.

*Offences*

18. Offences relating to trade and industry.
19. Offences relating to packaged goods.
20. Failure of seller to weigh or measure.
21. Trading without required weights and measures.
22. Fraud and forgery.
23. Obstruction of inspector.
24. Offences by inspectors.
25. Offences by bodies of persons.
26. Seizure and forfeiture.
27. Evidence as to possession.

*General*

SECTION

- 28. Permissible margin of error.
- 29. Conversion.
- 30. References to units in other enactments.
- 31. Vessels not represented as authorised measures.
- 32. Regulations.
- 33. Interpretation.
- 34. Repeals and savings.

SCHEDULES

FIRST SCHEDULE

*S.I. Units of Measurement - The Basic Units*

SECOND SCHEDULE

*Weights and Measures used for Trade and Industry*

THIRD SCHEDULE

*Conversion*

**N.R.C.D.326**

**WEIGHTS AND MEASURES ACT, 1975<sup>1</sup>**

**AN ACT to provide for the use of the International System of Units as the units of measurement in the use of weights and measures and for related matters.**

*Units of Measurement*

**1. International System of Units**

(1) The units of measurements to be used throughout Ghana shall be the units known as the International System of Units.

(2) The International System of Units comprises

- (a) the basic units set out in Part One of the First Schedule,
- (b) the supplementary and derived units set out in Part Two of the First Schedule, and
- (c) the units which may be used in conjunction with the basic, supplementary and derived units set out in Part Three of the First Schedule.

I. This Act was issued as the Weights and Measures Decree, 1975 (N.R.C.D. 326) made on the 16th day of April, 1975 and notified in the *Gazette* on 25th April, 1975.

(3) Multiples and sub-multiples of each of the units of the International System of Units shall be an integral power of ten, positive or negative, as set out in Part Four of the First Schedule.

## **2. Measurements in International System of Units**

Measurements shall be made by reference to the International System of Units or their multiples or sub-multiples, and any other units of measurement or their multiples or sub-multiples shall not be used.

## **3. Primary standards**

(1) The Minister shall, as occasion may require, procure or cause to be prepared and maintained national prototype standards of mass and measure of the units of the International System of Units set out in Part One of the First Schedule.

(2) The national prototype standards of mass and measure shall be verified and certified in terms of the international prototype standards of mass and measure, maintained and kept by the International Bureau of Weights and Measures, by the means and in the manner determined by the Minister.

(3) When so verified and certified the national prototype standards shall be the primary standards of mass and measure by reference to which in Ghana for the purposes of this Act the standards of mass and measure shall be maintained.

(4) The primary standards of mass and measure shall be in the form and of the material that the Minister may direct, and the form, material and place of keeping shall as far as practicable be of a generality that is proof against mechanical and atmospheric agencies and any other sources of error.

(5) The Minister shall cause to be maintained the weighing machines and any other articles that are necessary for giving effect to this section.

## **4. Secondary standards**

The Minister shall procure or cause to be prepared and maintained secondary standards of mass and measure consisting of the weights and measures set out in the Second Schedule, and shall cause the secondary standards to be verified from the primary standards.

## **5. Tertiary standards**

The Minister shall procure or cause to be prepared and maintained copies of the secondary standards and shall cause those copies to be verified as tertiary standards of mass and measure.

## **6. Working standards**

(1) The Minister shall, as occasion may require, procure or cause to be prepared and maintained working standards of mass and measure in the form that may be recommended by the Custodian of Weights and Measures, who shall verify the working standards by reference to the tertiary standards and cause an indelible mark to be made on the working standards.

(2) The working standards shall be used for the inspection, verification and authentication of weights and measures required by this Act, and for any other purposes directed by the Minister.

#### **7. Verification of standards**

(1) The Minister shall cause the primary standards to be verified at least once in every ten years at the International Bureau of Weights and Measures.

(2) Where the primary standards are to be sent out for verification, the Minister shall cause to be deposited with the Custodian of Weights and Measures the secondary standards that the Minister thinks fit after having provided for them to be compared and verified with the primary standards in the manner directed by the Minister and such secondary standards shall be deemed to be the primary standards during the time that the primary standards have been sent out for verification.

(3) The secondary, tertiary and working standards shall be compared and verified by the Custodian of Weights and Measures at the intervals and in the manner determined by the Minister.

(4) On being satisfied of the accuracy of the secondary, tertiary or working standards the Custodian of Weights and Measures shall issue certificates of verification and the certificates shall be retained by the persons who have custody of the relevant standards.

(5) The secondary, tertiary and working standards which have been duly verified and certified shall be true and accurate for the purposes of this Act and judicial notice shall be taken of each of those standards.

(6) The Minister may cancel a secondary, tertiary or working standard and shall by notification in the *Gazette* direct that the cancelled standard shall not be used for the purposes of this Act.

#### **8. Keeping of standards**

(1) The primary and secondary standards shall be kept in a place determined by the Minister in the custody and under the control of the Custodian of Weights and Measures who shall ensure their security in the manner directed by the Minister.

(2) The tertiary standards shall be kept in the custody of the persons and in the manner directed by the Minister.

(3) The working standards shall be kept in the custody of the Inspector of Weights and Measures and any other persons directed by the Minister.

#### *Weights and Measures for Trade and Industry*

#### **9. Weights and measures for use in trade and industry**

(1) A person shall not

- (a) use for trade or industry a unit of measurement of length, area, volume, or mass or weight, which is not included in the First Schedule; or

- (b) use for trade or industry, or have possession for use for trade or industry, of a weight or a linear, square or cubic measure which is not included in the Second Schedule.
- (2) Except as may be prescribed and subject to the Regulations,
- (a) a linear measure specified in Part One of the Second Schedule may be marked in whole or in part with divisions and subdivisions representing any shorter length or lengths;
  - (b) a cubic measure specified in Part Three of the Second Schedule shall not be used for trade or industry by means of a division or subdivision marked on that measure as a cubic measure of a lesser quantity.

### **10. Denominations of weights and measures**

- (1) A weight for use in trade or industry shall have the denomination of the weight marked on the top or side of the weight in legible figures and letters by the manufacturer.
- (2) Where the small size of a weight renders it impracticable to mark that weight, a certificate shall be supplied by the manufacturer in respect of the weight and the certificate shall be produced to an inspector on request and shall contain sufficient particulars to enable the identification and denomination of the weight to be established.
- (3) A measure of capacity for use in trade or industry shall have the denomination of the measure marked on the outside of the measure in legible figures and letters by the manufacturer.
- (4) A weight or measure not in conformity with this section shall not be stamped with a stamp or verification under section II.

### **11. Stamping, verification and issue of certificates**

- (I) Subject to this section, every weight, measure and an instrument for weighing or measuring for use in trade or industry shall be verified and stamped by an inspector with a stamp of verification, and the inspector shall issue a certificate of verification at the time of stamping.
- (2) Where the small size of a weight renders it impracticable for the inspector to stamp it with the stamp of verification, the inspector may on being satisfied with the identity and denomination of the weight, dispense with stamping and issue a certificate of verification.
- (3) A certificate of verification issued under subsection (I) or (2) shall remain in force for the prescribed period and shall during that period authorise the use of the weight, measure or instrument for weighing or measuring in any part of the Republic unless it is unjust.
- (4) A person who is in possession for use in trade or industry of a weight, measure or an instrument for weighing or measuring shall retain possession of the relevant certificate of verification and shall produce the certificate for inspection whenever required to do so by an inspector.

- (b) the steps required to be taken, and
- (c) the time within which the steps shall be taken.

(3) The Commission may in an enforcement notice direct the immediate cessation of the offending activity where it considers that the circumstances so demand.

(4) A person who acts contrary to an enforcement notice issued under this section commits an offence and is liable, on summary conviction, to a fine of not less than fifteen penalty units and not more than two hundred and fifty penalty units and in default to a term of imprisonment for a term not exceeding one year or to both the fine and the imprisonment; and in the case of a continuing offence to a further fine not exceeding five penalty units for each day that the offence continues after conviction.

#### **16. Grant of water right**

(1) A person may apply to the Commission in writing for the grant of water right.

(2) The Commission shall on receipt of an application make the necessary investigations including consultations with the inhabitants of the area of the water resources concerned.

(3) The Commission shall publish in the *Gazette* notice of an application and the area in respect of which the application is made.

(4) A person who claims that an interest of that person will be affected by the grant of a water right may notify the Commission within three months of the notice in the *Gazette* of the objection to the grant of the water right and shall specify the grounds of the objection.

(5) The Board shall consider the objections made in respect of it and shall after consultation with the persons and authorities that it may consider necessary, determine whether the water right shall be granted.

(6) Where the Board is satisfied that the water right shall be granted, it shall so grant the right.

(7) The Commission may grant the water right subject to the conditions specified in the document for the grant.

(8) A grant of water right is subject to ratification by Parliament.

(9) Parliament may by resolution supported by the votes of not less than two-thirds of all the members of Parliament exempt from the provisions of subsection (8) of this section the class of water right that it shall so resolve.

#### **17. Prohibition of transfer of water right**

A water right granted under this Act shall not be transferred without the written approval of the Commission.

#### **18. Creation of statutory wayleaves and easement**

Where the grant of a water right is to a statutory corporation or any other public body whose use of the water right ensures the benefit of the public, the provisions of the Lands (Statutory Wayleaves) Act, 1963 (Act 186) shall apply for the creation of a right of way or any other similar right for the purpose of enabling the works related to the water rights to be implemented.

- (3) The measures of capacity used for a purpose other than measuring liquids
- (a) shall be stricken with a round stick or roller, straight and the same diameter from end to end; or
  - (b) if the article sold cannot because of its size and shape conveniently be stricken, shall be filled in all parts as nearly to the level of the brim as the size and shape of the article will permit.

#### *Administration*

### **14. Custodian of Weights and Measures**

- (1) The Minister may, by notice published in the *Gazette*, appoint a person or body of persons to be Custodian of Weights and Measures for the purpose of carrying out this Act.
- (2) The Custodian shall be appointed on the terms and conditions that the Minister may by instrument of appointment determine.
- (3) The Minister may by way of the Regulations prescribe the functions of the Custodian.

### **15. Inspectors of Weights and Measures**

- (1) The Minister may, by notice published in the *Gazette*, appoint a Chief Inspector of Weights and Measures and a number of deputy chief inspectors and inspectors of weights and measures necessary to give effect to this Act.
- (2) An inspector shall make the returns and furnish the information that the Chief Inspector may require and generally shall conform to the directions of the Chief Inspector.
- (3) The functions of a deputy chief inspector may be determined by the Chief Inspector.
- (4) The Minister may from time to time give the Chief Inspector directions of a general character not inconsistent with the provisions of this Act and the Chief Inspector shall give effect to the directions.

### **16. Duties of Inspectors**

- (1) The Chief Inspector shall cause the working standards and instruments for weighing or measuring which the Chief Inspector thinks requisite to be procured and delivered to the inspectors and the inspectors shall, at the times and places appointed by the Chief Inspector of which appointments public notice shall be given, attend with the working standards and instruments for weighing and measuring, and examine the weight measures and instruments for weighing or measuring brought to the inspector.
- (2) An inspector shall examine each weight and measure which is brought for the purpose of verification, and shall compare it with the corresponding working standard and the inspector shall, if satisfied that it is just, and not already stamped or marked, stamp or mark it in the prescribed manner.

(3) An inspector shall stamp and mark in the prescribed manner an instrument for weighing or measuring brought or submitted for examination which the inspector finds to be just and accurate and not already stamped or marked.

(4) Wherever an inspector stamps, marks, or verifies any weight, measure or instrument for weighing or measuring, the inspector shall enter in the relevant book particulars of the stamping, marking or verification.

### **17. Powers of entry and seizure**

(1) An inspector may, subject to the production if so requested of the certificate of appointment, at a reasonable time enter a shop, store, warehouse, stall, yard or any other place, in which the inspector has reasonable cause to believe that goods are bought, sold, exposed, or kept for sale, or weighed or measured for conveyance or carriage, and may require the production of, and may examine, any weight or instrument for weighing or measuring that may be there.

(2) Where on the examination the inspector has reasonable cause to believe that any weight, measure or instrument for weighing or measuring is made or used contrary to a provision of this Act or of a statutory instrument made under the Act, the inspector may seize, carry away, and detain it for the purpose of comparing it with a working standard.

### *Offences*

### **18. Offences relating to trade and industry**

A person who uses in trade or industry, or is in possession for use in trade or industry, of a weight, measure or an instrument for weighing or measuring

- (a) which is false or unjust,
- (b) which is not authorised to be used under section 9,
- (c) which is not marked or certified in conformity with section 10,
- (d) which is not verified, stamped, certified or authenticated in conformity with sections 11 or 12, or
- (e) in respect of which a certificate of verification is not in force,

commits an offence and is liable on summary conviction to a fine not exceeding two hundred and fifty penalty units or to a term of imprisonment not exceeding twelve months or to both the fine and to imprisonment.

### **19. Offences relating to packaged goods**

(1) A person who sells goods whether personally or on behalf of another shall, if the goods are packaged or put into containers or are similarly prepared for exhibition or sale, cause both the net weights or measures to be declared on the package or container.

(2) A person required under subsections (1) to have the weight or measure of goods declared on the package or container who refuses or neglects to do so as required by subsection (1), commits an offence and is liable on summary conviction to a term of imprisonment not exceeding two years or to a fine not exceeding five hundred penalty units or to both the imprisonment and to a fine.

## **20. Failure of seller to weigh or measure**

(1) A person who sells goods, whether personally or on behalf of another, by weight or measure, shall on being so required by the person to whom the goods are delivered and in the presence of the last-mentioned person

(a) if the goods are sold by weight, weigh the goods, or (b)

if the goods are sold by measure, measure the goods.

(2) A person required under subsection (1) to weigh or measure the goods who refuses or neglects to do so as required by subsection (1) commits an offence and is liable on summary conviction to a fine not exceeding one hundred penalty units.

## **21. Trading without required weights and measures**

Where in a trade the transaction or dealing is to be determined by weight or measure and the trader in respect of the trade is not in possession of the weights, measures or instruments for weighing or measuring necessary for the trade, the trader commits an offence and is liable on summary conviction to a fine not exceeding one hundred penalty units.

## **22. Fraud and forgery**

A person who

(a) knowingly makes, sells or uses, or knowingly causes to be made, sold or used, an unjust weight, measure, or instrument for weighing or measuring,

(b) forges or counterfeits, or causes or procures to be forged or counterfeited, or knowingly assists in forging or counterfeiting, a stamp or mark used for stamping or marking any weight, measure or instrument for weighing or measuring,

(c) knowingly sells, disposes of or exposes for sale any weight, measure or instrument for weighing or measuring with a forged or counterfeit stamp or mark weight, measure or inform,

(d) with intent to defraud, alters any weight, measure or instrument for weighing or measuring stamped or marked in accordance with this Act, or

(e) commits a fraud in the use of trade or industry of any weight, measure or instrument for weighing or measuring,

commits an offence and is liable on summary conviction to imprisonment not exceeding two years or to a fine not exceeding five hundred penalty units or to both the imprisonment and to the fine.

## **23. Obstruction of inspector**

A person who

(a) neglects or refuses to produce for examination by an inspector when lawfully required to do so any certificate, weight, measure, or instrument for weighing or measuring in that person's possession or custody or on the premises of that person, or

(b) wilfully obstructs or hinders an inspector in the performance of his function under the Act,

commits an offence and is liable on summary conviction to a term of imprisonment not exceeding twelve months or to a fine not exceeding two hundred and fifty penalty units or to both the fine and to imprisonment.

#### **24. Offences by inspectors**

An inspector who

(a) stamps, marks or certifies a weight or measure without duly verifying it by comparison with the proper working standard, or

(b) repairs, alters or adjusts any weight, measure or instrument for weighing or measuring examined by the inspector,

commits an offence and is liable on summary conviction to a fine not exceeding one hundred penalty units.

#### **25. Offences by bodies of persons**

(1) Where an offence under this Act or under a statutory instrument made under this Act is committed by a body of persons,

(a) where the body of persons is a body corporate, every director or officer of that body corporate shall be deemed to have committed that offence; and

(b) where the body of persons is a firm, every partner of that firm shall be deemed to have committed that offence.

(2) A person shall not be convicted of an offence under subsection (1) if it is proved that the act in respect of the charge was committed by another person without the consent or connivance of, and that due diligence was exercised by that person to prevent the commission of that act having regard to the circumstances.

#### **26. Seizure and forfeiture**

(1) Where an inspector has reasonable cause to believe that an offence has been committed under this Act in respect of a weight, measure or an instrument for weighing or measuring, the inspector may seize and detain that weight, measure or instrument.

(2) Where the owner of the weight, measure or instrument cannot be found within thirty days after the seizure, that weight, measure or instrument shall be forfeited to the Republic.

(3) Subject to subsection (2), a weight, measure or an instrument for weighing or measuring in respect of which an offence is committed under this Act may be forfeited to the Republic by order of the Court.

(4) A weight, measure or an instrument for weighing or measuring which is forfeited to the Republic shall be destroyed or otherwise disposed of in the manner directed by the Chief Inspector.

#### **27. Evidence as to possession**

Where a weight, measure or an instrument for weighing or measuring is found in the possession of a person carrying on a trade or industry, or in or on the premises of a person which, whether in a building or in the open air and whether open or enclosed, is used for trade or industry, that person shall be deemed for the purposes of this Act, unless the contrary is proved, to have possession of that weight, measure or instrument for weighing or measuring for use in trade or industry.

*General*

**28. Permissible margin of error**

(1) A weight, measure or an instrument for weighing or measuring shall not have a greater error than the limits of error prescribed by the Regulations.

(2) A weight, measure or an instrument for weighing or measuring which is within the prescribed limits of errors shall be deemed to be just and true for the purposes of this Act.

**29. Conversion**

(1) For the purpose of expressing the values of the units of the International System of Units in terms of the values of other units of measurement, Part One of the Third Schedule shall have effect.

(2) For the purpose of expressing the values of other units of measurement in terms of the values of the units of the International System of Units, Part Two of the Third Schedule shall have effect.

**30. References to units in other enactments**

(1) A reference to units of measurement contained in an enactment in force on the commencement of this Act shall be construed by reference to the appropriate units of the International System of Units in accordance with the rates of conversion set out in the Third Schedule.

(2) Without prejudice to subsection (1), the Attorney-General may, by legislative instrument, adapt, amend, convert or modify the provisions of an enactment in order to replace references to units of measurement contained in that enactment by references to the units of the International System of Units in accordance with the rates of conversion set out in the Third Schedule or in that approximation to the units that the Attorney-General may consider necessary or desirable.

**31. Vessels not represented as authorised measures**

This Act shall not

(a) prevent the sale or subject a person to a penalty under this Act for the sale of anything in a vessel where the vessel is not represented as containing an amount of a measure authorised under this Act, or

(b) subject a person to a penalty under this Act for the possession of a vessel where it is shown that that vessel is not intended for use as a measure.

**32. Regulations**

The Minister may, by legislative instrument, make Regulations

(a) prescribing or making provision for anything which under this Act, may be prescribed or provided for by Regulations;

(b) prescribing the fees to be charged for stamping, marking or verifying weights, measures and instruments for weighing or measuring;

- (c) modifying, amending or revoking a provision of the Schedules; and
- (d) otherwise for carrying into effect the principles and purposes of this Act.

### 33. Interpretation

In this Act, unless the context otherwise requires,

**"functions"** includes powers and duties;

**"inspector"** includes the Chief Inspector, a deputy chief inspector and an inspector of weights and measures;

**"instrument for weighing"** includes a balance scale, beam, steel meter, counter poise and a machine for determining weight;

**"measure"** includes an instrument for the measurement of length, area, volume, capacity, temperature, pressure or gravity;

**"Minister"** means the Minister responsible for Trade;

**"prescribed"** means prescribed by the Regulations;

**"Regulations"** means Regulations made under this Act;

**"trade"** means a contract, bargain, sale or dealing made or had in Ghana for any work, goods, wares or merchandise or thing has been or is to be done, sold, delivered, carried or agreed for by weight or measure and the collection of tolls or duties charged or collected according to weight or measure.

### 34. Repeals and savings

*Spent<sup>2</sup>*

2. The original section provided that, "( t) The following enactments are hereby repealed section 27 of the Towns Ordinance, (Cap. 86);section 138 of the Criminal Code, 1960 (Act 29); the Weights and Measures Act, 1964 (Act 255).

(2) Notwithstanding the repeal of the Weights and Measures Act, 1964 (Act 255), and notwithstanding the foregoing provisions of this Decree, the use of any weight or measure authorised by the Weights and Measures Act, 1964 shall be lawful up to the 31st day of August, 1975. Provided that on and after the 1st day of September, 1975 only the International System of Units as prescribed by this Decree shall be used.

(3) Notwithstanding any of the foregoing provisions of this Decree, no prosecution shall be brought for any offence under this Decree until after such date as the Commissioner may specify by Legislative Instrument."

## SCHEDULES

## FIRST SCHEDULE

[Section I]

## PART ONE

*S.I. Units of Measurement - The Basic Units*

<i>Quantity</i>	<i>Name of Unit</i>	<i>Unit Symbol</i>
Length .....	metre .....	M
Time.....	second .....	S
Mass .....	kilogram .....	kg
Electric current .....	ampere.....	A
Thermodynamic temperature .....	kelvin.....	K
Luminous intensity.....	candela .....	cd

## PART TWO

*Supplementary and Derived Units*

Plane angle .....	radian .....	rad
Solid' angle .....	steradian .....	Sr
Area .....	square metre .....	M <sup>2</sup>
Volume .....	cubic metre .....	M <sup>3</sup>
Angular velocity.....	radian per second .....	rad/s
Angular acceleration .....	radian per second squared .....	rad/s <sup>2</sup>
Velocity.....	metre per second .....	<i>mls</i>
Acceleration .....	metre per second squared .....	<i>mls</i> <sup>2</sup>
Frequency.....	hertz .....	Hz (1 Hz = 1s <sup>-1</sup> )
Rotational frequency.....	reciprocal second .....	S <sup>-1</sup>
Density.....	Kilogram per cubic metre .....	kg/m <sup>3</sup>
Momentum .....	Kilogram metre per second .....	kg.m <sup>2</sup> /s
Angular momentum .....	Kilogram metre squared per second .....	kg.m <sup>2</sup>
Moment of inertia .....	Kilogram metre squared .....	N (N = kg.m/s <sup>2</sup> )
Force ... ..	newton .....	N.m
Moment of force .....	newton metre .....	<i>N/m</i>
Pressure stress .....	newton per square metre .....	<i>M<sup>2</sup>/S</i>
Kinematic viscosity .....	metre squared per second .....	Ns/m <sup>2</sup>
Dynamic viscosity .....	newton second per metre Squared .....	<i>N/m</i>
Surface tension .....	newton per metre .....	J (J = Nm)
Work, energy.....	joule .....	W (W = J/s)
Power .....	watt .....	<i>J/m<sup>2</sup></i>
Impact strength .....	joule per square metre .....	°C
Temperature .....	degree Celsius .....	

## PART TWO-continued

Temperature .....	kelvin degree Celsius .....	$K, ^\circ C$
Quantity of heat .....	joule .....	J
Linear expansion co-efficient .....	reciprocal Kelvin .....	$K^{-1}$
Heat flow rate .....	watt .....	W
Density of heat flow rate .....	watt per square metre .....	$W/m^2$
Thermal conductivity.....	watt per square kelvin .....	$W/(mK)$
Co-efficient of heat transfer .....	watt per square metre kelvin .....	$W/m^2K$
Heat capacity.....	joule per kelvin .....	$J/Kg K$
Specific heat capacity.....	joule per kilogram kelvin .....	$J/K$
Entropy .....	joule per kelvin .....	$J/kg K$
Specific entropy.....	joule per kilogram kelvin .....	$J/kg$
Specific energy specific latent heat ...	joule per kilogram .....	C-AS
Quantity of electricity, electric charge	coulomb .....	$C/m^3$
Volume density of charge .....	coulomb per cubic metre .....	$C/m^2$
Surface density of charge .....	coulomb per square metre .....	$VIm$
Electric field strength .....	volt per metre .....	
Electric tension, potential difference, electromotive force .....	volt .....	$V=W/A$
Displacement (electric) .....	coulomb per square metre .....	$C/m^2$
Electric flux, flux of displacement ....	coulomb .....	C
Electric capacitance .....	farad .....	F
Electric permittivity.....	farad per metre .....	$F/m$
Electric polarisation .....	coulomb per square metre .....	$C/m^2$
Electric dipole moment .....	coulomb per metre .....	$C/m$
Current density.....	ampere per square metre .....	$A/m^2$
Linear current density.....	ampere per metre .....	$A/m$
Magnetic field strength .....	ampere per metre .....	$A/m$
Magnetic potential difference .....	ampere .....	A
Magnetic flux density, magnetic induction .....	tesla .....	T ( $IT=1 \text{ Wb}/m^2$ )
Flux of magnetic induction, magnetic flux .....	weber .....	Wb ( $1 \text{ Wb}=IVs$ )
Magnetic vector potential.....	weber per metre .....	$Wb/m$
Self inductance, mutual inductance ..	henry .....	H ( $IH=IV/A$ )
Permeability .....	henry per metre .....	$HIm$
Electromagnetic moment, magnetic moment .....	ampere metre squared .....	$A/m^2$
Magnetisation .....	ampere per metre .....	$A/m$
Magnetic polarisation .....	tesla .....	T
Magnetic dipole moment .....	Newton metre squared .....	$Nm^2/A$
	per ampere or weber metre .....	Wbm

## PART TWO-continued

Impedance, reactance modulus of impedence .....	ohm .....	$\Omega$ ( $\Omega=V/A$ )
Admittance, susceptance, conductance .....	reciprocal ohm .....	$\Omega^{-1}$
Apparent power .....	volt ampere .....	VA
Reactive power .....	var .....	Var
Diffusion coefficient .....	squared metre per second .....	$M^2/s$
Thermal diffusion co-efficient .....	squared metre per metre .....	$M^2/s$
Luminous flux .....	lumen .....	lm (1 lm = 1 cd sr)
Luminance .....	candela per square meter .....	$Cd/m^2$
Illumination .....	lux .....	lx (1 lx = 1 lm/m <sup>2</sup> )
Activity of radionuclides .....	reciprocal second .....	$s^{-1}$

## PART THREE

*Units which may be used in Conjunction with Basic Units and Supplementary and Derived Units*

<i>Quantity</i>	<i>Name of Unit</i>	<i>Unit Symbol</i>
Time .....	minute .....	min.
	hour .....	h
	day .....	d
	week .....	week
	month .....	month
	year .....	year
Mass .....	tonne .....	t
	carat .....	carat
Radian .....	grade .....	g
	second .....	s
	minute .....	m
	degree .....	$^\circ$
Area .....	hectare .....	ha
	are .....	a
Volume .....	litre .....	l
Velocity .....	kilometre per hour .....	km/h
Rotational frequency .....	revolution per minute .....	r.p.m.
Pressure stress .....	bar .....	bar

PART THREE-continued

<i>Quantity</i>	<i>Name of Unit</i>	<i>Unit Symbol</i>
Viscosity:		
Kinematic .....	centistokes .....	cSt
Dynamic .....	centipoises .....	cP
Work energy.....	kilowatt hour.....	kWh
Activity of radionuclide .....	curie .....	ci

PART FOUR

*Multiples and Sub-multiples of Units of Measurement*

The names of the multiples and sub-multiples of the units of measurement are formed by means of the following prefixes:

<i>Factor by which the units multiplied</i>	<i>Prefix</i>	<i>Symbols</i>
10 <sup>12</sup> .....	tera .....	T
10 <sup>9</sup> .....	giga .....	G
10 <sup>6</sup> .....	mega .....	M
10 <sup>3</sup> .....	kilo .....	k h
10 <sup>2</sup> .....	hecto .....	
10 .....	deca .....	da
10 <sup>-1</sup> .....	deci .....	d
10 <sup>-2</sup> .....	centi .....	c
10 <sup>-3</sup> .....	milli .....	m
10 <sup>-6</sup> .....	micro .....	μ
10 <sup>-9</sup> .....	nano .....	n
10 <sup>-12</sup> .....	pico .....	p
10 <sup>-15</sup> .....	femto .....	f
10 <sup>-18</sup> .....	atto .....	a

APPENDIX

(i) *Definition of basic units*

*The metre (m):* unit of length. The metre is the length equal to 1,650,763.73 wavelengths in vacuum of the radiation corresponding to the transition between the levels 2p10 and 5ds of the krypton-86 atom.

*The second (s):* unit of time interval. The second is duration of 9,192,631,770 periods of the radiation corresponding to the transition between two hyperfine levels of the ground state of the caesium -I 33 atom.

## APPENDIX-continued

*The kilogram (kg):* unit of mass. The kilogram is equal to the mass of the international prototype of the kilogram.

*The ampere (A):* unit of electric current. The ampere is that constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular cross section, and placed 1 metre apart in a vacuum would produce between these conductors a force equal to  $2 \times 10^{-7}$  newtons per metre of length.

*The kelvin (k):* unit of luminous intensity. The candela is the luminous intensity, in the perpendicular direction, of a surface of 1,600,000 square metres of a black body at the temperature of freezing platinum under a pressure of 101,325 newtons per square metre.

(ii) *Definition of supplementary units*

*The radian (rad):* unit of plane angle. The angle between two radii of a circle which cuts off on the circumference and is equal in length to the radius.

*The steradian (sr):* unit of solid angle. The solid angle which, having its vertex in the centre of a sphere, cuts off an area of the surface of the sphere equal to that of a square having sides of length equal to the radius of the sphere.

## SECOND SCHEDULE

[Section 4]

*Weight and Measures used for Trade and Industry*

## PART ONE

*Linear Measures*

Measures of:

20 metres

10 metres

3 metres

2 metres

1 metre

1 decimetre

1 centimetre

## PART TWO

*Square Measures*

Any measures of, or of any multiple of 1 square decimetre.

PART THREE

*Cubic Measures*

Measures of:

Any multiple of 10 cubic decimetres

- 10 cubic decimetres
- 5 cubic decimetres
- 2.5 cubic decimetres
- 2 cubic decimetres
- 1 cubic decimetre
- 1,000 cubic centimetres
- 250 cubic centimetres
- 200 cubic centimetres
- 100 cubic centimetres
- 50 cubic centimetres
- 25 cubic centimetres
- 20 cubic centimetres
- 10 cubic centimetres
- 5 cubic centimetres
- 2 cubic centimetres
- 1 cubic centimetre

PART FOUR

*Weights*

(a) For dealings in articles or things other than precious metals and precious stones.

Weights of:

- 20 kilograms
- 10 kilograms
- 5 kilograms
- 1 kilogram
- 500grams
- 200grams
- 100 grams
- 50 grams
- 20grams
- 10 grams
- 5 grams
- 2 grams

PART FOUR--continued

I gram  
500 milligrams  
200 milligrams  
100 milligrams  
50 milligrams  
20 milligrams  
to milligrams  
5 milligrams  
2 milligrams  
I milligram

(b) For dealings involving precious metals and precious stones.

Weights of:

500 carats (metric)  
200 carats (metric)  
100 carats (metric)  
50 carats (metric)  
20 carats (metric)  
to carats (metric)  
5 carats (metric)  
2 carats (metric)  
I carat (metric)  
0.5 carat (metric)  
0.25 carat (metric)  
0.2 carat (metric)  
0.1 carat (metric)  
0.05 carat (metric)  
0.02 carat (metric)  
0.01 carat (metric)

*Note:* I carat (metric) = 0.2 gm. (exactly).

THIRD SCHEDULE  
[Section 29. Section 9 (2) (b)]

Conversion

PART ONE

Conversion of the Values of S I Units in Terms of the Values of Other Units of Measurement

	<i>S I Units</i>	<i>Other Units of Measurement</i>
(a)	<i>Length</i>	
	1 km (kilometre) .....	0.621371 miles
	1 km .....	4.97097 furlongs
	1 km .....	0.539612 nautical miles (UK)
	1 km .....	0.539957 (Int.) nautical miles (UK)
	1 m (metre) .....	0.497097 chain
	1 m .....	1.09361 yards
	1 m .....	3.28084 feet
	1 m .....	4.97097 links
	1 m .....	O. 198839 perch (Pole)
	1 m .....	0.546807 fathom
	1 cm (centimetre) .....	0.393701 inch
	1 m (micrometre) .....	0.0393701 mill inch (thou.)
(b)	<i>Area</i>	
	1 km <sup>2</sup> (kilometre squared) .....	0.386102 square miles 3.86102 x 10 <sup>3</sup> square miles 2.47105
	1 ha (hectare) .....	acres
	1 ha .....	9.88422 acres
	1 ha .....	11.9599 x 10 <sup>3</sup> square yards
	1 m <sup>2</sup> (metre squared) .....	1.19599 x 10 square yards
	1m <sup>2</sup> .....	10.7639 square feet 2.47105 x
	1 m <sup>2</sup> .....	10-3 square chain 0.1555000
	.. 1 cm <sup>2</sup> (centimetre squared ) .....	square inch 1.97353 circular mils
	1 mm <sup>2</sup> (millimetre squared) .....	
(c)	<i>Volumes</i>	
	1 m <sup>3</sup> (metre cubed) .....	1.30795 cubic yards
	1m <sup>3</sup> .....	35.3147 cubic feet
	1m <sup>3</sup> .....	27.4962 UK bushels
	1m <sup>3</sup> .....	28.3776 UK bushels
	1 m <sup>3</sup> .....	3.49157 US bushels
	1m <sup>3</sup> .....	1.74579 pipes
	1m <sup>3</sup> .....	0.872892 tun
	1 dm <sup>3</sup> (decimetre cubed) .....	0.264172 gallons
	1 dm <sup>3</sup> .....	0.219969 UK gallons

## PART ONE-continued

	<i>SI Units</i>	<i>Other Units of Measurement</i>
	1 dm <sup>3</sup> .....	2.11338 US liquid pints
	1 dm <sup>3</sup> .....	1.75976 UK pints
	1 dm <sup>3</sup> .....	0.879878 UK quart
	1 dm <sup>3</sup> .....	0.109984 peck
	1 dm <sup>3</sup> .....	7.03903 gills
	1 dm <sup>3</sup> .....	0.00343701 quarters
	1 cm <sup>3</sup> (centimetre cubed) .....	0.0610236 cubic inches
	1 cm <sup>3</sup> .....	0.0351951 UK fluid ounce
	1 cm <sup>3</sup> .....	0.281561 fluid drachm
	1 mm <sup>3</sup> (millimetre cubed) .....	0.0168936 UK minim
(d)	<i>Mass / Weight</i>	
	1 tonne .....	0.984203 tons (long)
	1 kg .....	1.10231 x 10 tons (short)
	1 kg .....	0.984203 x 10 tons (long)
	1 kg .....	0.0196841 hundredweight (cwt)
	1 kg .....	0.0220462 cental
	1 kg .....	0.0787364 quarter
	1 kg .....	0.157473 stone
	1 kg .....	2.20462 pounds
	1 g (gram) .....	0.035274 ounces (avoir)
	1 g .....	0.564383 dram (dr.)
	1 g .....	5.000 carats (metric)
	1 g .....	0.257206 drachm (apoth)
	1 g .....	0.0321507 ounce (apoth)
	1 g .....	0.771617 scruple
	1 g .....	0.6643017 pennyweight (dwt)
	1 g .....	15.4324 grains
	1 carat .....	3.08647 grains

## PART TWO

*Conversion of the Values of other Units of Measurement in Terms of the SI Units*

	<i>SI Units</i>	<i>Other Units of Measurement</i>
(a)	<i>Length</i>	
	1 mile .....	1.60934 km
	1 furlong .....	0.201168 km*
	1 chain .....	20.1168 m*

## PART TWO-continued

	<i>SI Units</i>	<i>Other Units of Measurement</i>
	1 yard .....	0.9144 m*
	1 foot .....	0.3048 m*
	1 inch .....	25.4 mm* = 2.54 cm*
	1 mill inch .....	25.4 m*
	1 (UK) nautical mile .....	1.85318 km*
	1 fathom .....	1.8288 m*
	1 link .....	0.201168 m*
	1 perch (Pole) .....	5.0292 m*
(b)	<i>Area</i>	
	1 square mile .....	2.58999 km <sup>2</sup> = 258.999 ha
	1 acre .....	4.046.86 m <sup>2</sup> = 0.404686 ha
	1 rood .....	1,011.71 m <sup>2</sup>
	1 square yard .....	0.836127 m <sup>2</sup>
	1 square foot .....	0.0929030 m <sup>2</sup> = 929.030 cm <sup>2</sup>
	1 square inch .....	645.16 mm <sup>2</sup> = 6.4516 cm <sup>2</sup>
	1 square chain .....	404.686 m <sup>2</sup>
	1 circular mil.....	506.707 m <sup>2</sup>
(c)	<i>Volume</i>	
	1 cubic yard .....	0.764555 m <sup>3</sup>
	1 cubic foot .....	0.0283168 m <sup>3</sup>
	1 cubic inch .....	16.3871 cm <sup>3</sup>
	1 barrel (US) (for petroleum) .....	0.158987 m <sup>3</sup>
	1 bushel.....	0.0363687 m <sup>3</sup>
	1 peck .....	9.09218dm <sup>3</sup>
	1 gallon .....	4.54609dm <sup>3</sup>
	1 gallon (US) .....	3.78541dm <sup>3</sup>
	1 quart .....	1.13652 md <sup>3</sup>
	1 pint .....	0.568261dm <sup>3</sup>
	1 gill .....	0.142065dm <sup>3</sup>
	1 fluid ounce .....	28.4131 cm <sup>3</sup>
	1 fluid drachm .....	3,551.63mm <sup>3</sup> = 3.55163 cm <sup>3</sup>
	1 minim .....	59.1939 mm <sup>3</sup>
	1 hog head .....	286.404dm <sup>3</sup>
	1 quarter .....	290.950dm <sup>3</sup>
	1 pipe .....	572.808 dm <sup>3</sup>
	1 tun .....	1,145.616 dm <sup>3</sup>
(d)	<i>Mass / Weight</i>	
	1 ton (long) .....	1,016.05 kg = 1.01605 tonne
	1 hundredweight .....	50.8023 kg

## PART TWO-continued

<i>S I Units</i>	<i>Other Units of Measurement</i>
1 cental .....	45.3592 kg
1 quarter .....	12.7006 kg
1 stone .....	6.35029 kg
1 dound.....	0.45359237 kg*
1 ounce .....	28.3495 g
1 dram .....	1.77185 g
1 grain .....	64.7989 mg = 0.323995 carat
1 carat .....	0.2g
1 ounce (apoth) .....	3 1.1 035
1 drachm .....	g 3.88973
1 scruple .....	g 1.29598
1 pennyweight (dwt) .....	g 1.55517
1 ton (short) .....	907.185 kg

*Note:* Accuracy of values quoted:

Some of the factors relating to common usage units and metric units can be expressed exactly and these are marked with asterisks. In other cases where the number does not terminate or only terminates after many digits, not more than 6 significant figures are quoted and the last figure given in the numeral which best represents the true value.

(5) A weight, measure and an instrument for weighing or measuring which has been stamped and verified under subsection (1) or (2) shall be authenticated within the intervals prescribed by the Minister.

(6) The verification and stamping or authentication under this section shall be made by reference to a working standard.

(7) Where a weight, measure or an instrument for weighing or measuring is of a character that it is not capable of being readily or conveniently brought to an inspector for the purpose of examination, the inspector shall on the written request of the person in possession of the weight, measure or instrument, and on payment of the prescribed fees, attend at the premises where it is located and there examine it.

(8) An inspector shall not verify, stamp, certify or authenticate a weight, measure or an instrument for weighing or measuring where

(a) it is not in conformity with subsection (1) or (2) of section 9; or

(b) it presents unusual features which do not conform to the pattern or specifications to that, that the Custodian of Weights and Measures may prescribe generally by notice published in the *Gazette*; or

(c) it contravenes or fails to comply with provisions of this Act or the Regulations.

## 12. Lead, pewter and iron weights

(1) A weight made of lead or pewter or of a mixture of both shall not be verified and stamped with a stamp of verification or certified or authenticated under section 11 nor shall the weight be used for trade.

(2) Subsection (1) does not apply where the weight is wholly and substantially cased with brass, copper or iron and is legibly marked "cased".

(3) This section does not prevent the insertion into a weight of a plug of lead or pewter that is necessary for the purpose of adjusting the weight and affixing the stamp of verification.

(4) An inspector may refuse to stamp an iron weight or a weight cased with iron unless it has a plug of softer metal on which to impress or affix the stamp.

## 13. Mode of filling measures of capacity

(1) A measure of capacity having a portion made of metal or any other suitable material, sufficient to bear the stamp of verification, extending from the lower end, and having the upper portion made wholly or partially of glass or any other transparent material so that the level of the surface of the contents may be clearly seen, and with the level line distinctly marked on the transparent portion, may be used for measuring liquids and shall be filled to the level of the line so marked.

(2) The measures used for measuring liquids not constructed as described in subsection (1) shall be filled to the level of the brim.