

DENTAL COUNCIL OF INDIA

DENTAL MECHANICS REGULATIONS

(Revised Courses)

Effective from the academic Session 1973-74

- I. Regulations for the maintenance of minimum educational standard for Dental Mechanics.
- II. The Dental Mechanics (Grant of Certificate) Regulations.

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PREFACE

DENTAL MECHANICS COURSE REGULATIONS

(Modified : 11-5-1972)

Framed by the Dental Council of India and approved by the Central Government under Dentists Act, 1948 – vide Government of India, Ministry of Health & Family Welfare (Deptt. of Health) letter No. V. 12011/3/72 – MPT dated 11- 5 – 1972.

DENTAL COUNCIL OF INDIA

REGULATIONS FOR THE MAINTENANCE OF MINIMUM EDUCATIONAL STANDARD FOR DENTAL MECHANICS

In exercise of powers conferred by clause (1) and (2) and sub-clause (g) and (h) of section 20 of the Dentists Act, 1948 (XVI of 1948), the Dental Council of India hereby make after consultations with the State Governments, the following.

Regulations for the maintenance of minimum educational standard for Dental Mechanics, the same having been approved by the Central Government.

Dental Mechanic is a person, who makes or repairs dental appliances and dentures including Inlay, Crown and Bridge work. He shall restrict his activities to purely Mechanical Laboratory work at the instance of the registered Dental Surgeon. He shall not do any chair-side work.

In order to regularize and standardize the conferment of the qualifications for Dental Mechanics, it is prescribed that:-

1. The institutions wishing to start courses for Dental Mechanics should seek prior approval of the Dental Council of India.
2. The course of studies should extend over a period of two academic years and lead to the qualification of Dental Mechanic Certificate.
3. A separate course shall be arranged for the training of Dental Mechanics by the institutions.

4. For the purpose of establishment of uniformity in dental education in this course throughout India. It is necessary that the course of instructions to be pursued in all the institutions should be standardized. To achieve this:-
- (i) a candidate should be atleast 15 years of age at the time of admission or within 3 months of it and should be medically fit.
 - (ii) a candidate must have passed sat-least Matriculation Examination of a recognized University taking Science subject or an equivalent recognized qualification.
5. The course of studies and regulations for the Certificate Examinations and the syllabus to be followed in each subject has been drawn up and appended.

MINIMUM REQUIREMENTS FOR INSTITUTIONS IMPARTING TRAINING FOR DENTAL MECHANICS

1. The minimum hours devoted to the undermentioned subjects shall be as follows:-

FIRST YEAR (Primary)

| Subject | Lectures | Practicals Laboratory/ Demonstrations | Total |
|------------------------------------|----------|---|----------|
| Applied Physics & Mechanics | 30 | 20 | 50 |
| Applied Chemistry | 30 | 20 | 50 |
| Applied Oral Anatomy | 20 | 90 | 110 |
| Dental Materials and Metallurgy | 20 15 | 40 15 | 60 30 |
| Dental Mechanics (Primary) | 30 | 600 | 630 |

| | | | |
|----------------------------|-----|-----|-----|
| Total | 145 | 785 | 930 |
| <u>SECOND YEAR (Final)</u> | | | |
| Dental Materials | 10 | 10 | 20 |
| and Matallurgy | 20 | 40 | 60 |
| Dental Mechanics (Final) | 30 | 785 | 815 |
| Total | 60 | 835 | 895 |

2. The classes in different subjects of the curriculum should be taught exclusively for this course.
3. There should be atleast one instructor for every 10 students working in Technical Laboratories.
4. For the teaching of dental subjects, no person except those holding recognized dental qualification shall be employed as instructors. For Practicals Lab./ Demonstrations, persons holding recognised Dental Mechanics Certificate shall also be eligible.
5. The institution imparting training in this course must be possessed of the following minimum requirements:-
 - (i) Sufficient class rooms atleast one of which must be equipped with a projector.
 - (ii) Satisfactory facilities should be provided for practicals/demonstrations on Applied Physics, Mechanics, Chemistry and Applied Oral Anatomy.
 - (iii) A suitable Library should be available to the students for reference on the subjects of the course.
 - (iv) Well equipped laboratories for Prosthetic and Orthodontic work.

(v) **Teaching Staff**

- (a) Assistant Professor (Full-time) One
- (b) Demonstrator/Lecturer – do -One
- (c) Tutor Technician – do -One

Approved by the Central Government vide Ministry of Health & F.W. (Deptt. of Health)'s letter No. A 11013/4/83 - PMS dated 19-1-84 for every 20 students.

- (d) Other Staff for teaching
Physics, Chemistry etc.as required.

(iii) The minimum amount of practical work that has to be completed by each student during his/her two years course:-

(1) **FULL DENTURES**

- Acrylic20
- Metal 5

(At least 2 Dentures against natural teeth in the opposing jaw)

(2) **Partial Dentures**

- Acrylic15
- Metal 5

(3) **Repairing/Relining of Dentures**20

- (4) **Inlays:** Acrylic10
- Metal10

(5) **Crowns:** Acrylic10

| | | |
|------|---|---------|
| | Metal |10 |
| (6) | Bridge work (various types) | 6 |
| (7) | Splints | 6 |
| (8) | Obturator and other surgical appliances | 3 |
| (9) | Orthodontic Study Casts | 6 |
| (10) | Orthodontic appliances | 12 |

NOTE: Appropriate Department to teach the Dental Mechanics Course

That in view of the difficulties experienced by dental departments and dental teachers of dental college, the teaching of Dental Mechanics Course be entrusted to the Department of Prosthetic Dentistry.

* Approved by the Central Government vide Miny. of Health & F.W. (Deptt. of Health)'s letter No. V. 12017/12/82-PMS dt. 17-2-83) (DCI – DE – 54 –82)

11. DENTAL MECHANICS (GRANT OF CERTIFICATE) REGULATIONS

In exercise of the powers conferred by sub-section (1) read with clause (g) and (h) of sub-section (2), of section 20 of the Dentists Act, 1948 (XVI of 1948) the Dental Council of India hereby make, after consultation with the State Governments, the following Regulations, the same having been approved by the Central Government.

These Regulations may be called the DENTAL MECHANICS GRANT OF CERTIFICATE REGULATIONS.

(1) An Examination for the grant of Certificate of Dental Mechanics shall be conducted by a Board of examiners appointed by an institution imparting training of Dental Mechanics and approved by the Dental Council of India and that atleast one of the Examiners must be an external from outside that Institution.

Note:- Qualifications/eligibility to appointment as Examiners for Dental Mechanics Examinations.

1. a) He should be registered in Part 'A' of the Dentists Register maintained under the Dentists Act, 1948 and – (GOI. MOH. No. F – 6 – 8/57 – MI dated 8 – 2 – 57) – DCI. 9G – 56.
- b) That medical persons teaching medical subjects may be appointed as Examiners for medical subjects esven thought they are not registered under the Dentists Act, 1948 - and – (GOI. MOH. No. F – 6 – 8/57 – MI dated 27 – 12 – 57) – DCI. 9G – 56.
2. He should be an active teacher of the concerned course ;or in the concerned subject/s at a recognized dental/medical institution:- (GOI. MOH. & FW (Deptt. of Health) – No. V 12017/11/82 – PMS dated 14-2-83) DCI – DE- 54 – 82

- (2) The examination shall be held twice a year, on such dates as may be fixed. The Examination shall consist of two parts entitled.
- (1) Primary and (2) Final Certificate Examination.

THE PRIMARY EXAMINATION

- (3) The examination shall be open to any student who (a) has been enrolled during the one academic year Proceeding the examination, in an institution recognised by the Dental Council of India for this purpose.
- (b) has his/her name, submitted to the Board of Examiners, by the Head of the institution in which he/she is enrolled.
- (c) produces the following certificates signed by the Head of the Institution:-
- (i) of good character,
- (ii) of having attended not less than 75% of the full course of lectures delivered and practicals conducted in each of the subjects of examination.

Provided that the Head of the institution shall have power to exclude any candidate from the examination, if he is satisfied that such a candidate is not a fit person to be admitted thereto.

- (4) Every candidate shall forward his/her application to the Examining Body by a date fixed by that body, accompanied by the prescribed fee. A candidate who fails to pass or present himself/herself for examination shall not be entitled to claim a refund of the fee but he/she

will be admitted to one or more subsequent examinations on payment of a like fee on each such occasion.

- (5) Every candidate should be examined in the following subjects comprising or two papers as follows:-

Paper I Applied Physics, Chemistry and Mechanics.

Paper II Dental Mechanics (Primary) and Applied Oral Anatomy.

Marks for each of the papers shall be as under:-

| | | | | | |
|--|------------------|----|------------|---------------------|--------------|
| Paper I : Applied Chemistry and Mechanics | Physics, Written | 75 | Oral 25 | Practicals | Total 100 |
| Paper II : Dental Mechanics (Primary) and Applied Oral Anatomy. | | 75 | 25 | 100 | 200 |

Each written paper shall be of three hours.

- (6) Every candidate shall be required to take up all subjects of the examination. A candidate failing in any paper or papers of this examination before being permitted to reappear at the subsequent examination, shall produce evidence of having pursued such a course of training as the Head of the institution may determine.

A candidate, who passes in any one or more papers under examination shall be exempted from appearing in which he/she has passed and shall be allowed to reappear in the rest in which he/she ha failed in any subsequent examination within a period of two years. Thereafter the candidate will have to appear in the papers of this examination.

- (7) The minimum number of marks required to pass the examination shall be fifty percent in each paper both in the (i) written and Oral and (ii) practical parts of the examination. Candidates who obtain minimum of seventy five percent of the marks in any paper shall be declared to have passed with distinction in that particular subject.

Candidates who do not pass in all the papers of the PRIMARY EXAMINATION at one and the same time shall not be declared to have passed with distinction.

- (8) As soon as possible after the examination, the Board of Examiners shall publish a list of the candidates who have passed. Each successful candidate shall be granted a PRIMARY CERTIFICATE.

THE FINAL EXAMINATION

- (9) This examination shall be open to any student who-
- a) has been enrolled during one academic year preceding the final examination in an Institution approved by the Dental Council of India for the purpose.
 - b) has previously passed the Primary Examination for the Certificate of Dental Mechanics.
 - c) has his/her name submitted to the Board of Examiners by the Head of the Institution in which he/she is enrolled.
 - d) produces the following certificates signed by the Head of the Institution:-

- i) of good character,
- ii) of having attended not less than seventy five percent of the full course of lectures delivered and practical/demonstration/clinical conducted in each of the subjects of the examination.
- iii) of having passed the Primary Examination in all papers.

Provided that the Head of the institution shall have power to exclude any candidate from the examination if he is satisfied that such a candidate is not a fit person to be admitted thereto.

- (10) Every candidate shall forward his/her application to the Examining Body by a date fixed by that Body, accompanied by the prescribed fee. A candidate who fails to pass or present himself/herself for examination shall not be entitled to claim a refund of the fee.
- (11) Every candidate shall be examined in the following subjects comprising of two papers as follows:-

Paper I Dental Mechanics (Final)

Paper II Dental Materials and Metallurgy.

Marks for each of the papers shall be as under:-

| Paper I. | Dental Mechanics (Final) | Written | Oral | Practical | Total |
|-----------|----------------------------------|---------|------|-----------|-------|
| | | 75 | 25 | 100 | 200 |
| Paper II. | Dental Materials & Metallurgy | 75 | 25 | | 100 |

Each written paper shall be of three hours.

- (12) Each candidate shall be required to take up all papers of the examination. A candidate failing in any paper or papers of this examination before being permitted to re-appear at the subsequent examination, shall produce evidence of having pursued such a course of training as the Head ;of the institution may determine.

A candidate, who passes in any one or more papers under examination shall be exempted from appearing in which he/she has passed and shall be allowed to re-appear in the rest in which he/she has failed in any subsequent examination within a period of two years. Thereafter the candidate will have to appear in all the papers of this examination.

- (13) The minimum number of marks required to pass the examination shall be fifty percent in each paper both in the (i) written and Oral and (ii) practical parts of the examination. Candidates who obtain minimum of seventy five percent of the marks in any paper shall be declared to have passed with distinction in that particular subject.

Candidate who do not pass in all the papers of the FINAL EXAMINATION at one and the same time shall not be declared to have passed with 'distinction'.

- (14) As soon as possible after the examination, the Board of Examiners shall publish a list of thee candidates who have passed. Each successful candidate shall be granted a certificate of FINAL EXAMINATION.

SYLLABUS FOR THE DENTAL MECHANICS COURSE

Applied Physics:

Specific gravity, density, properties of matter, including cohension, capillarity, surface tension viscosity, elasticity, diffusion and osmosis.

Heat: Temperature and its measurements Thermometers and Phrometers. General account of expansion by heat of solids, liquids and gases, Thermostats, Pressure gas and hydraulic. Boyle's and Charles Laws. Unit of heat, thermal capacity and specific Heat, Change of State; Latent heat; Melting Point. Properties of vapours, conduction, convection and radiation.

Principles of electro-technology applied to dental work room, small motors, constructional features and characteristics, electric furnaces, heaters, thermostats, pyrometers, spot welders, electroplating, electro-forming, and anodizing, Wiring regulations relating to low voltage supplies.

Exercises/Demonstrations:

- Balance – weighing correct to a milligram.
- Determination of specific gravity by the principle of Archimedes (Solids and liquids).

- Determination of surface tension ;of a liquid by capillary rise.
- Determination of Linear expansion of solids (level method).
- Determination of the specific heats of solids and liquids by the method of mixtures.

- Small motors-constructional features and characteristics (Demonstration only)
- Determination of the electro-chemical – equivalent of copper.

Applied Mechanics:

Forces, Parallelogram and triangle of forces. Moments, Couples, Centre of gravity, Principles of lever and centilever work, Energy, Power, Friction, Inclined plane, Screw Stress, Strain, Sheating Strain, Torsion, Bending movements, Strength and stiffness of materials.

Exercises/Demonstrations:

- Verification of the parallelogram and triangle laws of forces.
- Inclined plane Determination of mechanical advantage.
- Determination of Young's Modulus by bending of beams.

Applied Chemistry:

Distinction between physical and chemical change; elements, mixtures, and compounds; composition of the atmosphere; Oxygen oxides, burning and rusting; water solvent properties and crystallization; action of water on metals; composition of water hydrogen; Laws of chemical combination; meaning of chemical symbols valency; simple chemical equations; acids, bases and salts.

Electrolysis, The ionic theory of solution. The electropotential series, electroplating, General characteristics of the metals including an elementary study of the common metals and their compounds with special reference to those used in the dental work room.

Alcohol, ethers, aldehydes and ketones, fatty acids and their more important derivatives, amines. Simple treatment of carbohydrates, fats and proteins, Benzene and its homologues. General characteristics of aromatic substances. Synthetic resins and plastics used in Dentistry.

Exercises/Demonstrations:

- Tests for Acids and alkalis radicals.
- Acid-base titration- Neutralisation of acids with alkalis. Titration of N/10 NaOH with N/10 H₂SO₄ Phenolphthalein or Methyl red as indicator 2⁴.
- Total Nitrogen determination in organic nitrogenous materials by kjeldal digestion and distillation.
- Total Nitrogen determination in In-organic (ammoniacal) solutions (or salts) by direct distillation with Mg.
- Determination of Phosphorus in in-organic materials by precipitation.
- Determination of Potassium in aqueous solution by perchlorate method.

- Electrolytic deposition (electrolysis and electroplating of metals).
 - (a) Deposition of Copper by electrolysis of copper Sulphate solution.
 - (b) Calculation of E.C.E.

Dental Mechanics and applied Oral Anatomy:

Applied Oral Anatomy:

- Elementary anatomy of structure of denture/bearing area.
- Human dentition and occlusion.
- Functions of teeth and morphology of Crowns of teeth.
- Tooth Carving in wax and plaster.
- Muscles of mastication and facial expression.
- Mastication duplication and phonation.
- Movements of temporomandibular joint.

Dental Mechanics (Primary):

- Impression Preservation and Boxing-in.
- Cast: Preparation, Trimming, including Orthodontic casts.
- Cast duplication – various methods.
- Construction of special trays - spacers
- Bite blocks- base plates and wax rims.
- Articulators: Classification New Delhi uses – care of articulators.
- Adjustments, Mounting of casts.
- Articulation, Occlusal plane, protrusive balance, working bite, balancing bite, curve of space, compensating curve, lateral curve.

- Principles of selection of teeth.
- Setting of teeth and wax finishing.
- Flasking, Dewaxing, Packing, curing and Deflasking.
- Finishing and polishing of dentures.
- Additions, repairs, relining and revasing of dentures.
- Immediate denture construction.
- Making of acrylic teeth.
- Kennedy's classification of partial dentures.

- Principles of partial denture, design, clasp surveyor, surveying, path of insertion and removal. Establishment of clasp seat. Clasp's parts, classification, function and reciprocation.
- Principles of wire bending, Preparation of wrought clasps, occlusal rests and lingual bars.

Dental Mechanics (Final):

Casting machines: Centrifugal and pressure casting machines, Furnaces. Principles of casting.

Casting techniques of partial denture (skeleton) Clasps, bars, occlusion rest.

Setting of teeth and completion of dentures on metal skeletons.

Mechanical principles of Orthodontic appliances, anchorage, force, tissue changes and retention.

Stainless steel wire-preparation of clasps, springs and Arch wires for Orthodontic appliances.

Use of various types of expansion screws.

Preparation of removable Orthodontic appliances, Activators, Retention appliances and Oral screen.

Construction of fixed Orthodontic appliances, bands, tubes and arches.

Soldering and spot welding-Soldering of clasps, tags, Strengtheners and lingual bars.

Inlays and Crowns-classification and construction-facing & backings.

Casting Procedures.

Principles of bridge work-types of abutments – abutments and pontics-
construction of bridges using porcelain and acrylic pontics.

DENTAL MATERIALS AND METALLURGY

Dental Materials:

Composition, Properties, Uses, Advantages & Disadvantages of the following materials:-

Plaster of Paris;

Stone plaster,

Investment Materials,

All Impression Materials,

Tray Materials,

Denture Base Materials, both for cold curing and heat curing, Tooth Materials
Waxes,

Base Plates,

Zinc Oxide,

Dental Cement, & other Materials used in Dentistry.

Dental Metallurgy:

- Metallurgical Terms,
- General
- Study of:
 - (a) Metals used in Dentistry particularly Gold, Silver, Copper, Zinc, Tin, Lead and Aluminium.
 - (b) Alloys used in Dentistry particularly, Casting Gold Wrought Gold Silver Alloys, Stainless Steel, Ch. Cobalt Alloys.
- Heat treatment-annealing and tempering.
- Solders, Fluxes, Anti Fluxes.
- Tarnish and Corrosion.
- Electric Deposition.