NEET MDS Conservative Dentistry and Endodontics Sample Paper – 3

Duration: 25 Minutes **Maximum Marks: 100**

Instructions

- This paper contains **25** Multiple Choice Questions (Single Correct Answer), modelled on the Conservative Dentistry and Endodontics portion of **NEET MDS** (NBEMS).
- Each correct answer carries **4 marks**. There is **negative marking of 1 mark** for each incorrect answer; unattempted questions are not penalised.
- Only **one** option is correct. Choose carefully.
- Syllabus level: **BDS-level Conservative Dentistry and Endodontics as per the NBEMS NEET MDS syllabus**.
- Use of mobile phones, calculators, or electronic gadgets is strictly prohibited.

Q1. The high-molecular-weight base (oligomer) monomer that forms the organic resin matrix of most conventional dental composites is:

(A) Polyacrylic acid

(B) Hydroxyethyl methacrylate (HEMA)

(C) Bis-GMA (bisphenol-A glycidyl dimethacrylate)

(D) Camphorquinone

Q2. The configuration factor ("C-factor") of a prepared cavity is defined as the ratio of:

(A) Bonded (adhered) surface area to unbonded (free) surface area

(B) Unbonded surface area to bonded surface area

(C) Cavity depth to cavity width

(D) Filler weight to matrix weight

Q3. The low-viscosity diluent monomer commonly added to Bis-GMA to lower viscosity and permit higher filler loading is:

(A) Triethylene glycol dimethacrylate (TEGDMA)

(B) Bis-GMA

(C) Polyacrylic acid

(D) Benzoyl peroxide

Q4. Microfilled composites owe their superior surface polish to colloidal silica filler particles of approximately:

(A) 1–5 μm

(B) 0.04 μm (about 40 nm)

(C) 10–50 μm

(D) 100 μm

Q5. The volumetric polymerisation shrinkage of a typical resin composite on curing is of the order of:

(A) 2–5%

(B) 15–20%

(C) Less than 0.01%

(D) About 40%

Q6. The photoinitiator most widely incorporated in light-cured composites, activated by blue light near 468 nm, is:

(A) Camphorquinone

(B) Barium sulphate

(C) Colloidal silica

(D) Zinc oxide

Q7. In resin composite chemistry, the "degree of conversion" refers to the:

(A) Filler content expressed by weight

(B) Volumetric shrinkage on setting

(C) Maximum depth of cure achievable

(D) Percentage of aliphatic C=C double bonds converted to single bonds during polymerisation

Q8. Which cavity configuration carries the HIGHEST C-factor and therefore the greatest polymerisation shrinkage stress on the bonded interface?

(A) A Class IV incisal cavity

(B) A Class III proximal cavity

(C) A two-surface Class II cavity

(D) A bonded Class I (occlusal box) cavity

Q9. Nanofilled composites achieve both high mechanical strength and excellent long-term polish retention because they contain:

(A) Nanosized particles and nanoclusters, allowing use in both anterior and posterior restorations

(B) Only coarse macrofiller particles

(C) No inorganic filler at all

(D) Metallic silver-tin filler particles

Q10. The setting reaction of conventional glass ionomer cement is best described as:

(A) Free-radical polymerisation of dimethacrylate monomers

(B) Chelation of zinc oxide by eugenol

(C) Crystallisation of calcium sulphate dihydrate

(D) An acid–base reaction between fluoroaluminosilicate glass and polyacrylic acid

Q11. The principal property that makes glass ionomer cement anticariogenic is its ability to:

(A) Polymerise to a very high degree of conversion

(B) Bond purely by micromechanical resin tags

(C) Release and later recharge fluoride ions over time

(D) Develop very high compressive strength

Q12. In the accepted classification of glass ionomer cements, a cement formulated for luting/cementation of crowns and bridges is designated:

(A) Type III (liner and base)

(B) Type II (restorative)

(C) Type IV (fissure sealant)

(D) Type I (luting)

Q13. A Type II glass ionomer cement is primarily indicated for:

(A) Luting of cast crowns and orthodontic bands

(B) Restoration of teeth (aesthetic/reinforced restorative)

(C) Use only as a cavity liner beneath amalgam

(D) Root-canal obturation

Q14. Resin-modified glass ionomer cement (RMGIC) differs from conventional GIC chiefly by the addition of:

(A) Zinc oxide and eugenol

(B) Free phosphoric acid

(C) HEMA and photocurable resin, giving a dual (light plus acid–base) set

(D) Fine metallic filler particles

Q15. Glass ionomer cement bonds to tooth structure principally through:

(A) Resin tags formed in etched enamel only

(B) Simple frictional/mechanical interlock

(C) Van der Waals forces alone

(D) Chemical (ionic) bonding of carboxyl groups to calcium of hydroxyapatite

Q16. A compomer is most accurately described as a:

(A) Conventional (fully acid–base) glass ionomer cement

(B) Resin-modified glass ionomer cement

(C) Polyacid-modified composite resin

(D) Silver-reinforced amalgam alloy

Q17. Compared with a conventional glass ionomer, a compomer:

(A) Releases substantially more fluoride than GIC

(B) Sets primarily by light-activated polymerisation and needs a separate bonding agent

(C) Is self-adhesive and requires no bonding agent

(D) Sets solely by an acid–base reaction with water uptake

Q18. The classical fourth-generation dentin bonding system is characterised by:

(A) A single-bottle self-etch formulation

(B) An all-in-one (etch, prime and bond in one step) agent

(C) Three separate steps — total etch, then primer, then adhesive resin

(D) Complete elimination of any acid conditioning

Q19. The "hybrid layer" of dentin bonding is formed by:

(A) Resin infiltration into the demineralised, collagen-rich zone of dentin

(B) Resin tags penetrating etched enamel prisms

(C) The retained smear layer over intact dentin

(D) Sedimented inorganic filler particles

Q20. A self-etch adhesive system is characterised by the fact that it:

(A) Requires a separate 37% phosphoric-acid rinse and dry step first

(B) Uses acidic functional monomers that condition and prime simultaneously, with no separate rinse

(C) Is identical to the three-step fourth-generation technique

(D) Contains no resin monomer at all

Q21. Within a multi-step dentin bonding system, the role of the PRIMER is to:

(A) Selectively etch enamel margins

(B) Provide the bulk of inorganic filler

(C) Wet the demineralised dentin and carry hydrophilic monomers into the exposed collagen mesh

(D) Act as the final light-cured protective glaze

Q22. With total-etch adhesives, the "wet bonding" technique on dentin is advocated in order to:

(A) Prevent collapse of the demineralised collagen network and preserve space for resin infiltration

(B) Dilute and neutralise the residual etchant

(C) Accelerate the light-curing reaction

(D) Deliberately increase polymerisation shrinkage

Q23. The eighth-generation dentin bonding agents are distinguished from earlier systems mainly by the incorporation of:

(A) A higher proportion of volatile solvent

(B) Added free phosphoric acid

(C) Eugenol as a plasticiser

(D) Nanofillers to reinforce the adhesive and hybrid layer

Q24. Hybrid composites were developed principally in order to:

(A) Eliminate inorganic filler entirely

(B) Combine the strength of macrofiller particles with the smooth polish of microfiller particles

(C) Provide sustained fluoride release like GIC

(D) Set by an acid–base reaction rather than by light

Q25. To ensure adequate polymerisation, the recommended maximum thickness of each incrementally placed and light-cured composite layer is about:

(A) 5–6 mm

(B) 2 mm

(C) 0.1 mm

(D) 10 mm

Detailed Solutions

Q1.

Solution

Concept — Composite resin matrix: Bis-GMA is the classic high-molecular-weight dimethacrylate oligomer that forms the continuous organic matrix; UDMA is an alternative base monomer. On light activation these dimethacrylates cross-link to bind the filler together. **Why other options are wrong:** Polyacrylic acid belongs to glass ionomer chemistry; HEMA is a hydrophilic diluent/adhesive monomer; camphorquinone is the photoinitiator, not the matrix. **Final Answer:** Bis-GMA

Answer: (C) Go Back to Q1

Q2.

Solution

Concept — C-factor: The configuration factor is the ratio of bonded surfaces to unbonded (free) surfaces. A high C-factor means fewer free surfaces to relieve shrinkage stress, so more stress is transmitted to the adhesive bond. **Why other options are wrong:** It is not the inverse ratio, nor a depth-to-width or filler-to-matrix ratio. **Final Answer:** Bonded / unbonded surface area

Answer: (A) Go Back to Q2

Q3.

Solution

Concept — Diluent monomer: TEGDMA is a low-viscosity dimethacrylate added to viscous Bis-GMA to improve handling and allow higher filler loading; however, it also increases polymerisation shrinkage. **Why other options are wrong:** Bis-GMA is the viscous base itself; polyacrylic acid is a GIC component; benzoyl peroxide is a chemical-cure initiator. **Final Answer:** TEGDMA

Answer: (A) Go Back to Q3

Q4.

Solution

Concept — Microfilled composites: They contain colloidal silica particles of roughly 0.04 μm (40 nm), which give an exceptionally smooth, polishable surface ideal for anterior aesthetic restorations. **Why other options are wrong:** 1–5 μm and 10–50 μm sizes describe hybrid/macrofill fillers; 100 μm particles belong to obsolete macrofills. **Final Answer:** $\boxed{\text{about } 0.04\ \mu\text{m}}$

Answer: (B) Go Back to Q4

Q5.

Solution

Concept — Polymerisation shrinkage: Conversion of monomer to polymer brings molecules closer together, producing a volumetric shrinkage of roughly 2–5%, which is the source of shrinkage stress and marginal gaps. **Why other options are wrong:** 15–20% and 40% grossly overstate it; less than 0.01% understates it. **Final Answer:** $\boxed{2\text{–}5\%}$

Answer: (A) Go Back to Q5

Q6.

Solution

Concept — Photoinitiator: Camphorquinone absorbs blue light (peak ≈468 nm) and, with a co-initiator tertiary amine, generates free radicals that start polymerisation; this is why curing lights emit blue light. **Why other options are wrong:** Barium sulphate and zinc oxide are radiopacifiers/fillers; colloidal silica is a filler, none of which initiate the cure. **Final Answer:** $\boxed{\text{Camphorquinone}}$

Answer: (A) Go Back to Q6

Q7.

Solution

Concept — Degree of conversion: This is the proportion of reactive carbon–carbon double bonds that are converted into single bonds during polymerisation. A higher degree of conversion means better mechanical properties and less residual monomer. **Why other options are wrong:** Filler content, shrinkage and depth of cure are separate parameters, distinct from the fraction of double bonds reacted. **Final Answer:** $\boxed{\%\text{ of C=C bonds converted}}$

Answer: (D) Go Back to Q7

Q8.

Solution

Concept — C-factor and cavity design: A bonded Class I cavity has five bonded walls and only one free surface, giving a C-factor of about 5 — the highest of common cavity forms — so shrinkage stress at the bond is greatest. **Why other options are wrong:** Class IV, Class III and Class II cavities present more free surfaces, giving lower C-factors and less stress. **Final Answer:** Class I (occlusal box)

Answer: (D) Go Back to Q8

Q9.

Solution

Concept — Nanofilled composites: They contain nanometre-sized particles and agglomerated nanoclusters, combining strength for posterior stress-bearing use with excellent, durable polish for anterior aesthetics — a true "universal" composite. **Why other options are wrong:** Coarse macrofillers alone polish poorly; a filler-free or metal-filled resin is not a nanofill composite. **Final Answer:** Nanoparticles + nanoclusters

Answer: (A) Go Back to Q9

Q10.

Solution

Concept — GIC setting: Conventional glass ionomer sets by an acid–base reaction: polyacrylic acid attacks the fluoroaluminosilicate glass, releasing calcium and aluminium ions that cross-link the polyacid chains into a hydrogel matrix. **Why other options are wrong:** Free-radical polymerisation is composite chemistry; eugenol chelation is ZOE; gypsum crystallisation is a model material, not GIC. **Final Answer:** Acid–base reaction

Answer: (D) Go Back to Q10

Q11.

Solution

Concept — Fluoride release: GIC releases fluoride from its glass over time and can be "recharged" by topical fluoride exposure, giving a sustained anticariogenic effect around the restoration. **Why other options are wrong:** Its degree of conversion, bonding mechanism and compressive strength do not by themselves explain its anticariogenic action. **Final Answer:** Fluoride release and recharge

Answer: (C) Go Back to Q11

Q12.

Solution

Concept — GIC classification: Type I glass ionomer is the luting/cementation cement (fine particle size, low film thickness); Type II is restorative; Type III is a liner/base. **Why other options are wrong:** Type III, Type II and a fissure-sealant designation do not describe the luting cement. **Final Answer:** Type I (luting)

Answer: (D) Go Back to Q12

Q13.

Solution

Concept — Type II GIC: Type II is the restorative glass ionomer, used to restore teeth (including aesthetic and metal-reinforced/high-viscosity subtypes) rather than merely to cement or line. **Why other options are wrong:** Luting is Type I, a liner beneath amalgam is Type III, and GIC is not a root-canal obturating material. **Final Answer:** Restoration of teeth

Answer: (B) Go Back to Q13

Q14.

Solution

Concept — RMGIC: Resin-modified GIC incorporates HEMA and photopolymerisable resin so that it sets by both the conventional acid–base reaction and a light-cured polymerisation (dual/triple cure), improving early strength and reducing moisture sensitivity. **Why other options are wrong:** ZOE, free phosphoric acid and metal fillers are not the defining additions of RMGIC. **Final Answer:** HEMA + photocurable resin

Answer: (C) Go Back to Q14

Q15.

Solution

Concept — GIC adhesion: Glass ionomer bonds chemically: carboxylate groups of the polyacid form ionic bonds with calcium ions of hydroxyapatite, giving true chemical adhesion to both enamel and dentin without a separate bonding agent. **Why other options are wrong:** Its bonding is not merely resin-tag, frictional or van der Waals in nature. **Final Answer:** Ionic bond to calcium

Answer: (D) Go Back to Q15

Q16.

Solution

Concept — Compomer: A compomer (polyacid-modified composite resin) is essentially a composite to which acidic (polyacid) monomers and reactive glass are added; the name blends "compo"(site) and (io)"mer". **Why other options are wrong:** It is neither a pure GIC nor an RMGIC, and it is certainly not an amalgam alloy. **Final Answer:** Polyacid-modified composite

Answer: (C) Go Back to Q16

Q17.

Solution

Concept — Compomer setting: A compomer sets primarily by light-activated free-radical polymerisation (the acid–base reaction is minor and only follows water uptake); it is not self-adhesive and therefore requires a bonding agent. **Why other options are wrong:** It releases less fluoride than GIC, is not self-adhesive, and does not set mainly by an acid–base reaction. **Final Answer:** Light-cure + needs bonding agent

Answer: (B) Go Back to Q17

Q18.

Solution

Concept — Fourth-generation bonding: The fourth-generation total-etch system uses three separate steps — acid etching of enamel and dentin, application of a primer, and then the adhesive resin — and is the reference for forming a reliable hybrid layer. **Why other options are wrong:** Single-bottle self-etch and all-in-one systems are later generations; total-etch systems do use acid conditioning. **Final Answer:** Three-step total-etch

Answer: (C) Go Back to Q18

Q19.

Solution

Concept — Hybrid layer: Described by Nakabayashi, the hybrid layer forms where adhesive resin infiltrates the demineralised, collagen-rich surface of dentin and polymerises, entangling with the exposed collagen fibrils to seal the tubules. **Why other options are wrong:** Etched enamel prisms, the smear layer and settled filler are not the resin–collagen hybrid zone. **Final Answer:** Resin-infiltrated demineralised dentin

Answer: (A) Go Back to Q19

Q20.

Solution

Concept — Self-etch adhesives: These systems use acidic functional monomers that simultaneously demineralise and prime the tooth surface, incorporating the smear layer, with no separate rinse step — reducing technique sensitivity and post-operative sensitivity. **Why other options are wrong:** They avoid a separate phosphoric-acid rinse, differ from the three-step fourth-generation approach, and still contain resin monomer. **Final Answer:** Acidic monomers etch + prime together

Answer: (B) Go Back to Q20

Q21.

Solution

Concept — Role of the primer: The primer is an amphiphilic solution (e.g. HEMA in a solvent) that wets the demineralised, moist dentin and carries hydrophilic monomers into the collagen network, priming it for the hydrophobic adhesive resin. **Why other options are wrong:** Etching is the conditioner's job, filler load is unrelated, and the primer is not a final glaze. **Final Answer:** Wets dentin and carries monomer into collagen

Answer: (C) Go Back to Q21

Q22.

Solution

Concept — Wet bonding: With total-etch systems, leaving the etched dentin slightly moist keeps the demineralised collagen network expanded; over-drying collapses the collagen and prevents resin infiltration, weakening the hybrid layer. **Why other options are wrong:** Wet bonding is not about diluting the etchant, speeding the cure, or increasing shrinkage. **Final Answer:** Keeps collagen expanded for resin infiltration

Answer: (A) Go Back to Q22

Q23.

Solution

Concept — Eighth-generation adhesives: The eighth-generation bonding agents incorporate nanofillers within the adhesive, improving mechanical strength, hybrid-layer thickness and bond durability compared with earlier all-in-one systems. **Why other options are wrong:** More solvent, added phosphoric acid, or eugenol are not the defining feature of eighth-generation systems. **Final Answer:** Nanofiller-containing adhesive

Answer: (D) Go Back to Q23

Q24.

Solution

Concept — Hybrid composites: Hybrid composites blend larger (glass) filler particles with small colloidal silica so that they combine the strength and wear resistance of macrofills with the polishability of microfills — a good general-purpose composite. **Why other options are wrong:** They do not eliminate filler, release fluoride, or set by an acid–base reaction. **Final Answer:** $\boxed{\text{Strength of macrofill + polish of microfill}}$

$\boxed{\textbf{Answer: (B)}}$ **Go Back to Q24**

Q25.

Solution

Concept — Incremental curing: Because light is attenuated with depth, each composite increment should be limited to about 2 mm (for conventional composites) to ensure light reaches the base and achieves adequate depth of cure, minimising unpolymerised resin and shrinkage stress. **Why other options are wrong:** 5–6 mm and 10 mm exceed the effective cure depth of conventional composites; 0.1 mm is impractically thin. **Final Answer:** $\boxed{\text{About 2 mm per increment}}$

$\boxed{\textbf{Answer: (B)}}$ **Go Back to Q25**

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	C	2	A	3	A	4	B	5	A
6	A	7	D	8	D	9	A	10	D
11	C	12	D	13	B	14	C	15	D
16	C	17	B	18	C	19	A	20	B
21	C	22	A	23	D	24	B	25	B