CHAPTER B - Micro Wave Diathermy (MWD) – Production & Technique:

1. A patient with chronic knee pain arrives for MWD. Your intern asks: "How are microwaves actually produced in the machine?" Name the key component and its basic function (one sentence).
2. In the production of MWD, the magnetron operates at a specific frequency. State the exact frequency and why it's chosen (ISM band reason).
3. Historical note: The magnetron was originally developed for what non-medical purpose, and how does it generate microwaves? (brief: ≤15 words)
4. Technique starts with patient preparation. List THREE essential steps before switching on the MWD machine.
5. A nervous patient asks about safety. During preparation, what is the single most critical item to remove from the treatment area and why?
6. Selection of applicator: Name TWO common types of MWD applicators (directors) and one clinical factor influencing choice.
7. For a small area like elbow tendinitis, which applicator size is preferred and why? (one line)
8. Power level selection: Modern MWD machines output up to ___ W (fill max typical), but starting power for most treatments is ___ W (fill low end).
9. Application technique: The applicator is placed at a specific distance from skin. State the usual range (in cm) and reason for not touching skin.
10. Dosage dilemma: For acute vs chronic conditions, how does dosage differ in terms of power and duration? (compare in one sentence)
11. Physiological effects: Name THREE primary physiological responses to MWD heating in tissues.
12. Therapeutic effects scenario: A post-op patient with stiffness. Which therapeutic effect of MWD makes it suitable here? (one effect + reason)
13. Dangers alert: List FOUR potential dangers of MWD, including one unique to eyes.
14. Safety in application: If the patient reports uneven heating during treatment, what immediate adjustment to technique or power?
15. Integrated case: For shoulder bursitis, outline a full technique: production component, one prep step, applicator choice, power start, dosage example, one effect, one danger to avoid.

ANSWER KEY:

1. Magnetron – a vacuum tube that generates high-frequency microwaves by interaction of electrons with a magnetic field.
2. 2450 MHz; allocated as ISM band to avoid interference with communication frequencies.
3. Radar in WWII; generates via cavity resonance and electron oscillation.
4. Any three: Explain procedure/consent, Remove metals/jewelry, Check contraindications, Position comfortably, Expose area.
5. Metallic objects; microwaves induce currents causing burns.
6. Circular and rectangular directors; factor: size/shape of treatment area or depth needed.
7. Small applicator (e.g., 6 cm diameter); concentrates energy for localized heating.
8. Up to 200 W; starting 10–20 W.
9. 5–10 cm; prevents burns from near-field effects and allows even distribution.
10. Acute: low power (mild warmth), short duration (5–10 min); Chronic: higher power (strong heat), longer (15–20 min).
11. Any three: Vasodilation/increased blood flow, Elevated tissue metabolism, Muscle relaxation, Pain reduction via gate theory, Sedation of nerves.
12. Increased extensibility of collagen; promotes joint mobility and reduces stiffness.
13. Any four: Burns/scalds, Overheating implants, Eye cataracts, Testicular damage, Pacemaker interference, Haemorrhage aggravation.
14. Reduce power or increase applicator distance; re-check for hot spots.
15. Production: Magnetron generates 2450 MHz; Prep: Remove jewelry; Applicator: Medium circular; Power: Start 20 W; Dosage: 15 min moderate heat; Effect: Vasodilation for pain relief; Danger: Avoid eyes with goggles.