



Assignment

M.Sc. Zoology
Semester-II

Title of Assignment: Mammalian Physiology
BMR

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- Don't use red ink writing.
- Some Biochemical reactions required to explain BMR.

BMR (Basic metabolic Rate) :-

*. Contents →

- Introduction ✓
- Definition - BMR ✓
- Measurement of BMR ✓
- Normal values of BMR ✓
- factors affecting BMR ✓
- Significance ✓

* Introduction →

- Food is the fuel source of the body, the ingested food undergoes metabolism to liberate energy required for the vital activities of the body.
- Man consume energy to meet the fuel demands of the three ongoing processes in the body.
 - (i) Basal metabolic rate ✓
 - (ii) Specific dynamic action ✓
 - (iii) Physical activity ✓

* Basal Metabolic rate →

- BMR - minimum amount of energy required by the body to maintain life at complete physical and mental rest in post absorptive state.
- Several functions within the body occur at basal condition.

- Working of heart and other organs
- Conduction of nerve impulse
- reabsorption by renal tubules
- gi- motility
- ion transport across membrane

* Measurement of BMR →

- BMR can be measured by the apparatus of Benedict and Roth (Closed circuit device) or by Douglas bag method (Open circuit device)
- The Subjects should be awake, at complete physical and mental rest, in post absorptive state (ie, the patient should not have taken anything by mouth for the past 12hrs) and in a comfortable surrounding.

* Benedict - Roth Method :-

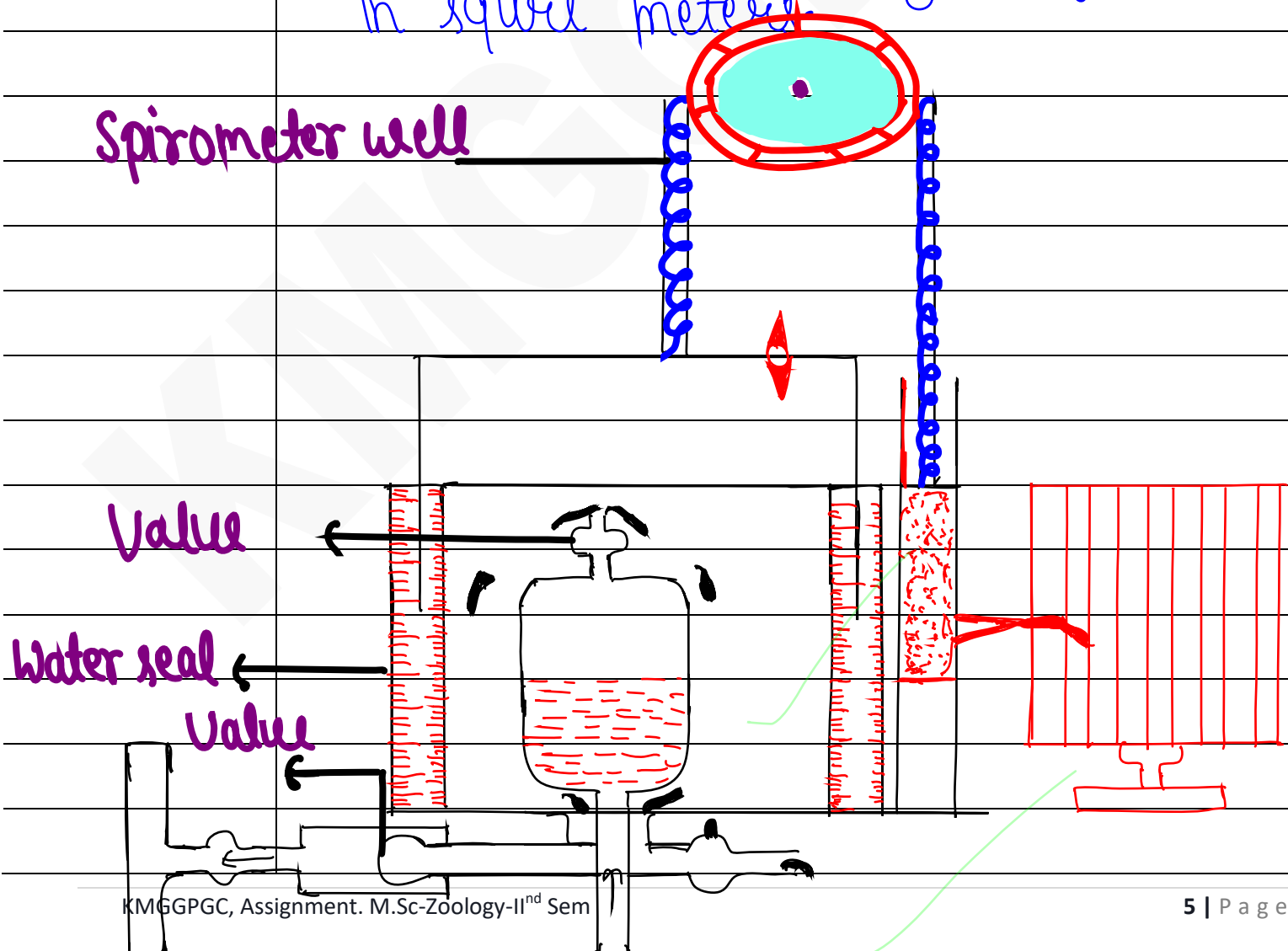
- The volume of oxygen consumed by the Subject for a period of 2-6 minutes under basal conditions is determined (E)

- The standard calorific value of one litre of oxygen consumed is 4.825
~~Heat produced in 6 min = $4.825 * 6$~~
~~Heat produced in 1hr = $4.825 * 10$~~
- Body surface area (A) = $10.725 * W^{0.425} * H^{0.725}$
 71.84

H = height in centimeter square
 W = weight in kg

- BMR = Total heat production in kcal per hour / Body surface area in square meters

Spirometer well





Schematic diagram of Benedict-Roth spirometer used of measuring oxygen consumption.

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Normal value of BMR :-

- Adult man, 35-38 cal/Sq. m/hr or 1600 cal/day
- Adult woman, 32-35 cal/Sq. m/hr or 1400 cal/day
- A BMR value between -15% and 20% is considered normal.

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Factors affecting BMR :-

- Surface area; directly proportional to surface area.
- Sex: Men have marginally higher BMR (5%)
- Age: In infants and growing children BMR is higher. In adults

BMR decreases at the rate of 2% per decade of life. ✓

- Physical activity: increase with regular exercise.

- Hormones: Thyroid hormones increase BMR.

Epinephrine, cortisol, sex hormones and growth hormone hormones increase BMR.

- Disease status: BMR is elevated in infections, leukemia, Cardiac failure hypertension etc.

*. Significance of BMR :-

- BMR is important to calculate the caloric requirement of an individual and planning of diet.
- Assessment of thyroid function.

- BMR is below normal in starvation, under nutrition, Addison's disease

- BMR is above normal in fever, diabetes insipidus, leukemia and polycythemia.

