



Jawapan Praktis Pengukuhan

Bab 1

1.1 Peralatan Perlindungan Diri *Personal Protective Equipment*

1. perlindungan
protect
2. (a) (i) Gogal / *Goggles*
(ii) Topeng muka / *Face mask*
(iii) Sarung tangan / *Gloves*
(iv) Baju makmal / *Lab coat*
(v) Kasut bertutup / *Closed shoes*
(b) (i) Kabinet aliran laminar / *Laminar flow cabinet*
(ii) Kebuk wasap / *Fume chamber*
(iii) Penyiram kecemasan / *Safety shower*
(iv) Pembilas mata / *Eyewash station*

1.2 Pembuangan Bahan Sisa *Disposal of Waste*

3. (a) Bahan yang boleh dibuang ke dalam singki
Substances that can be disposed of into sinks
(b) Bahan yang tidak boleh dibuang ke dalam singki
Substances that cannot be disposed of into sinks
4. A – Peralatan tajam
Sharp equipment
B – Non-sharp solid
Pepejal tidak tajam
C – Bangkai, organ
Carcasses, organ
D – Cecair badan
Body fluids

1.3 Pemadam Kebakaran *Fire Extinguishers*

5. air, buih, karbon dioksida, serbuk kering
water, foam, carbon dioxide, dry powder
6. (a) Jenis air / *Water type*
Memadamkan kebakaran yang melibatkan pepejal
Extinguishes fires that involves solids
(b) Jenis buih / *Foam type*
Memadamkan kebakaran yang melibatkan bahan cecair dan gas mudah terbakar
Extinguishes fires that involves flammable liquid and gas
(c) Jenis karbon dioksida / *Carbon dioxide type*
Memadamkan kebakaran yang melibatkan peralatan elektrik, gas dan wap
Extinguishes fires that involves electrical appliances, gas and vapour
(d) Jenis serbuk kering / *Dry powder type*
Memadamkan semua jenis kebakaran
Extinguishes all types of fires

7.

Cabutkan pin <i>Remove the pin</i>	→	Halakan muncung alat pemadam kebakaran <i>Aim the nozzle of the fire extinguisher</i>	→	Tekan tuil <i>Squeeze the handle</i>	→	Layangkan semburan ke kiri dan ke kanan <i>Sweeping the nozzle from side to side</i>
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Jawapan Praktis Pengukuhan **Bab 2**

2.1 Resusitasi Kardiopulmonari (Cardiopulmonary resuscitation, CPR)

Cardiopulmonary resuscitation

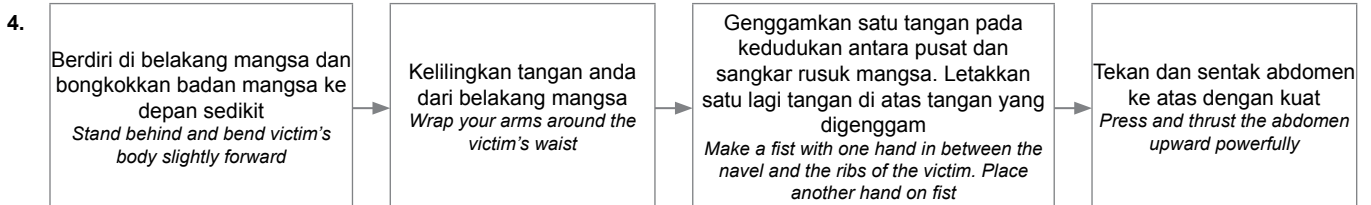
1. tekanan pada bahagian dada, hembusan udara.
chest compression, artificial air ventilation.



2.2 Heimlich Manoeuvre

Heimlich Manoeuvre

3. tercekik
choking





Jawapan Praktis Pengukuhan **Bab 3**

3.1 Suhu Badan

Body Temperature

1. kepanasan, kesejukan
hotness, coldness
2. (a) Termometer klinik / *Clinical thermometer*
(b) Termometer makmal / *Laboratory thermometer*
(c) Termometer rektal / *Rectal thermometer*
(d) Termometer inframerah / *Infrared thermometer*
3. pencerutan
kink

3.2 Kadar Denyutan Nadi

Pulse Rate

4. bilangan degupan jantung per minit
number of heartbeats per minute.
5. Titik nadi
Pulse points

3.3 Tekanan Darah

Blood Pressure

6. darah
blood
7. sfigmomanometer
sphygmomanometer
8. milimeter merkuri (mmHg)
millimetre mercury (mmHg)
9. (a) Sistolik / *Systolic*
(b) Diastolik / *Diastolic*

3.4 Indeks Jisim Badan (BMI)

Body Mass Index (BMI)

10. jisim badan, ketinggian
body mass, height
11. (a) Bersenam dengan kerap / *Exercise frequently*
(b) Mengambil gizi seimbang / *Practise balance diet*



Jawapan Praktis Pengukuhan **Bab 4**

4.1 Environmental Sustainability

Kelestarian Alam Sekitar

1. membantu alam sekitar dan alam semula jadi, meminimumkan kesan negatif
conserve the environment and nature, minimising the negative effects
2. (a) kecekapan tenaga, ketidakbergantungan tenaga
energy efficiency, energy independence
(b) meminimumkan
minimising
(c) ekonomi negara
country's economy
(d) kualiti hidup
quality of life

4.2 Sektor Tenaga

Energy Sector

3. Isu Sosiosaintifik
Socio-scientific Issues
(a) tidak boleh baharu / *non renewable*
(b) gas rumah hijau / *greenhouse gases*
(c) iklim / *climate*

Aplikasi Teknologi Hijau

Application of Green Technology

- (a) boleh baharu / *renewable*
- (b) kecekapan tenaga / *energy efficiency*

4.3 Sektor Pengurusan Sisa dan Air Sisa

Waste and Wastewater Management Sector

4. Isu Sosiosaintifik
Socio-scientific Issues
(a) ekosistem / *ecosystem*
(b) Pencemaran / *pollution*
(c) Peningkatan / *Increase*

Aplikasi Teknologi Hijau

Application of Green Technology

- (d) pengurangan / *reduction*
- (e) kitar semula / *recycling*
- (f) pemprosesan / *processing*
- (g) konsep 5R / *5R concept*

4.4 Sektor Pertanian dan Perhutanan

Agriculture and Forestry Sector

5. Isu Sosiosaintifik
Socio-scientific Issues
(a) Penebangan pokok / *Deforestation*
(b) Jerebu / *Haze*
(c) racun, baja kimia / *pesticides, chemical fertilisers*

Aplikasi Teknologi Hijau

Application of Green Technology

- (d) kompos / *compost*
- (e) Penanaman semula / *Replanting trees*
- (f) undang-undang / *Law*

4.5 Sektor Pengangkutan

Transportation Sector

6. Isu Sosiosaintifik
Socio-scientific Issues
(a) rumah hijau / *greenhouse*
(b) Kekurangan / *Depleting*
(c) Hujan asid / *Acid rain*

Aplikasi Teknologi Hijau
Application of Green Technology
(d) Hijau / *Green*
(e) Gas Asli / *Natural Gas*
(f) bahan api bio / *biofuel*

4.6 Teknologi Hijau dan Kehidupan ***Green Technology and Life***

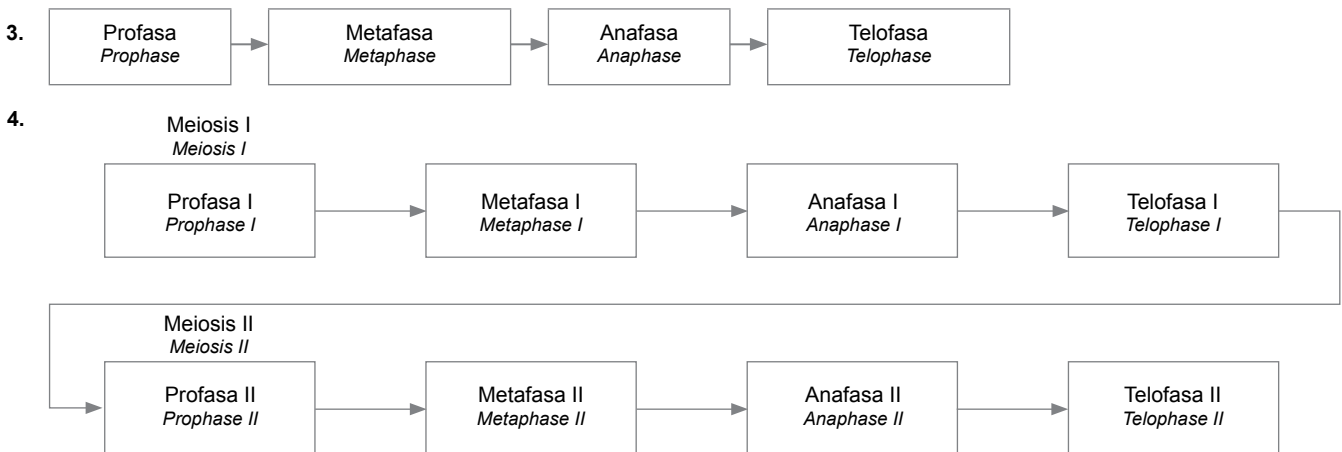
7. Jejak kaki karbon
Carbon footprint



Jawapan Praktis Pengukuhan **Bab 5**

5.1 Pembahagian Sel *Cell Division*

1. (a) Nukleus / *Nucleus*
(b) Kromosom / *Chromosome*
(c) DNA / *DNA*
(d) Gen / *Gene*
2. (a) Mitosis / *Mitosis*
(b) Meiosis / *Meiosis*



5.2 Pewarisan *Inheritance*

5. (a) gen / *genes*
(b) Trait / *Traits*
(c) • lokus / *locus*
• dominan, resesif / *dominance, recessive*
6. Hukum Mendel / *Mendel's law*
7. 46
(a) 22
(b) 2
8. 44 + XY
9. 44 + XX

5.3 Mutasi *Mutation*

10. (a) bilangan, struktur / *number, structure*
Sindrom Down, Sindrom Turner, Sindrom Klinefelter
Down syndrome, Turner syndrome, Klinefelter syndrome
(b) perubahan kimia / *Chemical change*
Buta warna, anemia sel sabit, talasemia
Colour blindness, sickle cell anaemia, thalassemia

5.4 Teknologi Kejuruteraan Genetik *Genetic Engineering Technology*

11. (a) DNA rekombinan / *Recombinant DNA*
(b) Terapi gen / *Gene therapy*
(c) Organisma termodifikasi genetik / *Genetically modified organisms*

5.5 Variasi *Variation*

12. (a) Variasi selanjara / *Continuous variation*
(b) Variasi tak selanjara / *Discontinuous variation*



Jawapan Praktis Pengukuhan

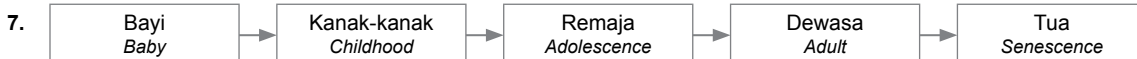
Bab 6

6.1 Sokongan, Pergerakan dan Pertumbuhan Haiwan *Support, Movement and Growth in Animals*

1. (a) rawan lembut, tulang keras
soft cartilage, bones
(b) kitin, cangkerang
chitin, shell
(c) bendalir dalam rongga badan
fluids in the body cavity
2. rangka paksi, rangka apendaj.
axial skeleton, appendicular skeleton.

6.2 Pergerakan dan Pertumbuhan Manusia *Human Movement and Growth*

3. Otot berantagonis, Pengecutan, pengenduran
Antagonistic muscle, contraction, relaxation
4. (a) Tendon / *Tendon*
(b) Ligamen / *Ligament*
(b) Sendi / *Joint*
5. S, sigmoid
S, sigmoid
6. tangga / *step*



6.3 Sokongan, Pertumbuhan dan Kestabilan dalam Tumbuhan *Support, Growth and Stability in Plants*

8. batang, akar / *stem, root*
9. (a) kesegahan sel / *cell turgidity*
(b) tisu berkayu yang keras / *hard woody tissues*
10. (a) Daya apungan / *Buoyancy force*
(b) Tisu aerenkima / *Aerenchyma tissue*
11. (a) Akar banir / *Buttress roots*
(b) Akar sokong / *Prop roots*
(c) Akar cengkam / *Clasping roots*
(d) Akar jangkang / *Stilt roots*
(e) Sulur paut / *Tendrils*
12. gelang pertumbuhan / *growth rings*



Jawapan Praktis Pengukuhan **Bab 7**

7.1 Sistem Endokrin Manusia

Human Endocrine System

1. (a) Merangsang penyerapan semula air pada ginjal
Stimulates the reabsorption of water in the kidneys
Merangsang pertumbuhan
Stimulates growth
(b) Mengawal kadar metabolisme badan
Controls the rate of body metabolism
(c) Meningkatkan kadar metabolisme, degupan jantung dan pernafasan semasa kecemasan
Increases metabolism rate, heartbeat and breathing during emergencies
(d) Mengawal aras gula darah
Controls the blood sugar level
(e) Mengawal perkembangan ciri-ciri sekunder perempuan
Controls the development of female secondary sexual characteristics
Mengawal kitar haid
Controls the menstrual cycle
(f) Mengawal perkembangan ciri-ciri sekunder lelaki
Controls the development of male secondary sexual characteristics
2. (a) Hipotiroidisme / *Hypothyroidism*
(b) Diabetes insipidus / *Diabetes insipidus*
(c) Diabetes melitus / *Diabetes mellitus*

7.2 Gangguan kepada Koordinasi Badan

Disruptions to Body Coordination

3. (a) Melambatkan / *Slows down*
(b) Mempercepat / *Speeds up*
(c) pernafasan / *breathing*
(c) Mengubah / *Changes*

7.3 Minda yang Sihat

Healthy Mind

4. Minda / *mind*
5. (a) dapat membantu masyarakat yang kesusahan.
able to help society in need.
(b) dapat membina keluarga bahagia.
able to build a happy family.
(c) menjalinkan hubungan baik dengan rakan sekerja.
forge a good relationship among colleagues.
(d) mengamalkan nilai-nilai keagamaan dan moral yang baik.
practise religious and moral values.



Jawapan Praktis Pengukuhan

Bab 8

8.1 Jirim

Matter

1. mempunyai jisim, memenuhi ruang / *occupies space, has mass*
2. pepejal, cecair, gas / *solid, liquid, gas*.
3. atom, molekul, ion / *atoms, molecules, ions*.

8.2 Jadual Berkala Unsur Moden

Modern Periodic Table of Elements

4. kumpulan / *group*
5. kala / *period*
6. (a) berkurang / *decrease*
(b) bes, asid / *basic, acidic*
(c) berkurang, bertambah / *decrease, increase*
7. nombor proton yang menaik / *increasing proton number*
8. bilangan proton / *number of protons*
9. mengelilingi nukleus / *around the nucleus*
10. melepaskan / *donates*
11. menerima / *accepts*

8.3 Isotop

Isotope

12. sama, berbeza. / *same, different*
13. jumlah bilangan proton dan bilangan neutron / *the total number of protons and neutrons*
14. Radioisotop / *Radioisotopes*



Jawapan Praktis Pengukuhan **Bab 9**

9.1 Aloi *Alloy*

1. pengaloiian / *alloying*.
2. rapat, teratur, kuat, keras / *closely, orderly, stronger, harder*.
3. (a) Besi dan karbon
Iron and carbon
(b) Aluminium, kuprum, magnesium dan mangan
Aluminium, copper, magnesium and manganese
(c) Timah, antimoni dan kuprum
Tin, antimony and copper
(d) Kuprum dan zink
Copper and zinc
(e) Kuprum dan timah
Copper and tin

9.2 Kaca dan Seramik *Glass and Ceramic*

4. silika / *silica*
5. tanah liat / *clay*

9.3 Polimer *Polymer*

6. Polimer, monomer / *polymer, monomer*
7. percantuman / *joining*
8. penguraian / *splitting*
9. isoprena / *isoprene*
10. sulfur / *sulphur*
11. (a) lebih keras dan kenyal
harder and more elastic
(b) lebih tahan haba
resistant to heat
(c) tidak mudah teroksida di udara
difficult to be oxidised in air



Jawapan Praktis Pengukuhan **Bab 10**

10.1 Perubatan Tradisional, Perubatan Moden dan Perubatan Komplementari *Traditional Medicine, Modern Medicine and Complementary Medicine*

1. (a) (i) semula jadi / *natural*
(ii) perlahan / *slow*
(iii) pengalaman / *experiences*
(iv) rendah / *Low*
- (b) (i) sintetik / *synthetic*
(ii) cepat / *fast*
(iii) klinikal / *Clinically*
(iv) tinggi / *High*
- (c) (i) perubatan moden / *modern medicine*
(ii) alternatif / *Alternative*

10.2 Radikal Bebas *Free Radical*

2. tidak berpasangan, tidak stabil / *unpaired, unstable*
3. (a) Kanser / *Cancer*
(b) Penuaan / *Aging*
(c) Penyakit jantung / *Heart diseases*
(d) Penyakit kencing manis / *Diabetes mellitus*

10.3 Bahan Antioksidan *Antioxidant Substances*

4. radikal bebas / *free radicals*
5. elektron tambahan, elektron tambahan / *extra electrons, extra electrons*

10.4 Produk Kesihatan *Health Products*

6. penyembuhan, pencegahan / *cure, prevention*



Jawapan Praktis Pengukuhan **Bab 11**

11.1 Gerakan Linear

Linear Motion

1. (a) Jumlah panjang lintasan, meter (m) / *total path length, metre (m)*
(b) terpendek, meter (m) / *shortest, metre (m)*
(c) jarak, meter per saat (m s^{-1}) / *distance, metre per second (m s^{-1})*.
(d) jumlah jarak, meter per saat (m s^{-1}) / *total distance, metre per second (m s^{-1})*
(e) sesaran, meter per saat (m s^{-1}) / *displacement, metre per second (m s^{-1})*
(f) halaju, meter per saat per saat (m s^{-2}) / *velocity, metre per second per second (m s^{-2})*

11.2 Graf Gerakan Linear

Linear Motion Graphs

2. Graf sesaran-masa
Displacement-time graph
(a) sesaran, masa / *displacement, time*
(b) kadar perubahan sesaran, halaju / *the rate of change of displacement, velocity*

Graf halaju-masa

Velocity-time graph

- (a) sesaran, halaju, pecutan / *displacement, velocity, acceleration*
(b) kadar perubahan halaju, pecutan / *rate of change of velocity, acceleration*.
(d) luas di bawah graf / *the area under the graph*

11.3 Pecutan Graviti dan Jatuh Bebas

Gravitational Acceleration and Free Fall

3. daya graviti / *gravitational force*
4. pecutan graviti, g / *gravitational acceleration, g*
5. gesaran, rintangan udara / *friction, air resistance*.

11.4 Jisim dan Inersia

Mass and Inertia

6. kuantiti jirim, kilogram (kg) / *quantity of matter, kilogram (kg)*
7. pegun, sedang bergerak / *at rest, in motion*
8. besar / *larger*



Jawapan Praktis Pengukuhan **Bab 12**

12.1 Penggunaan Tenaga Nuklear *The Use of Nuclear Energy*

1. bahan api fosil / *fossil fuel*

12.2 Penghasilan Tenaga Nuklear *The Production of Nuclear Energy*

2. Pembelahan nuklear
Nuclear fission
 - (a) memisahkan / *splitting*
 - (b) uranium / *uranium*

Pelakuran nuklear
Nuclear fusion

- (a) percantuman / *combining*
- (b) matahari / *sun*

12.3 Impak Penggunaan Tenaga Nuklear *Impact of Using Nuclear Energy*

3.
 - (a) Kesan somatik (keletihan, katarak, loya)
Somatic effect (fatigue, cataract, nausea)
 - (b) Kesan genetik (mutasi sel, kanser, kecacatan pada bayi)
Genetic effect (cell mutation, cancer, deformation in babies)

12.4 Tenaga Nuklear di Malaysia *Nuclear Energy in Malaysia*

4. Menyokong pembinaan stesen jana nuklear di Malaysia
Support the construction of nuclear power station in Malaysia
 - (a) bahan api fosil / *fossil fuel*
 - (b) murah / *Cheaper*
 - (c) minimum / *minimum*

Membantah pembinaan stesen jana nuklear di Malaysia
Against the construction of nuclear power station in Malaysia

- (a) lebih selamat / *safer*
- (b) tinggi / *high*
- (c) sisa radioaktif / *radioactive wastes*