

SUGGESTED ANSWERS
JOHOR STPM PHYSICS TRIAL EXAMINATION 2009
PAPER 1

1 D	11 D	21 C	31 D	41 C
2 D	12 C	22 C	32 D	42 B
3 D	13 C	23 D	33 A	43 D
4 B	14 D	24 A	34 C	44 B
5 C	15 C	25 D	35 A	45 D
6 A	16 A	26 D	36 D	46 A
7 C	17 C	27 B	37 C	47 A
8 B	18 C	28 A	38 B	48 A
9 B	19 C	29 D	39 A	49 C
10 B	20 D	30 D	40 C	50 D

JABATAN PELAJARAN NEGERI JOHOR
STPM TRIAL EXAMINATION 2009
ITEM SPECIFICATION TABLE
PHYSICS PAPER 1

No.	Topic	Subtopic	Skill level			No. of question	% of total question
			M	P	S		
A	Mechanics						
1.	Physical quantities & Units	1.1 Base quantities & SI units				1	2.0
		1.2 Dimensions	1				
		1.3 Scalars & vectors					
		1.4 Errors					
2.	Kinematics	2.1 Rectilinear motion				1	2.0
		2.2 Motion-constant acceleration			1		
		2.3 Graphs					
		2.4 Projectile motion					
3	Dynamics	3.1 Newton's Laws of Motion		1		1	2.0
		3.2 Conservation of momentum					
		3.3 Collision					
4.	Work, Energy and Power	4.1 Work	1			2	4.0
		4.2 Energy		1			
		4.3 Power					
5.	Circular motion	5.1 Uniform circular motion	1			2	4.0
		5.2 Centrepetal acceleration					
		5.3 Centrepetal force					
		5.4 Examples of circular motion			1		
6.	Rigid Body Rotation	6.1 Rotational kinematics				3	6.0
		6.2 Centre of mass & gravity					
		6.3 Moment of Inertia	1				
		6.4 Torque	1/2				
		6.5 Rotational Kinetic Energy					
		6.6 Angular Momentum Conservation	1/2				
		6.7 Rolling motion		1			
7.	Statics	7.1 Equilibrium of forces					
		7.2 Turning effect of force or Moment					
		7.3 Equilibrium of Rigid body					
8.	Gravitation	8.1 Newton's law of gravitation				1	2.0
		8.2 Gravitational Field strength					
		8.3 Gravitational potential					
		8.4 Escape velocity		1			
		8.5 Satellite motion					
		8.6 Weightlessness					
9.	Simple Harmonic Motion	9.1 Kinematics of SHM	1			3	6.0
		9.2 Energy of SHM			1		
		9.3 Example of SHM			1		
		9.4 Free oscillations					
		9.5 Damped oscillations					
		9.6 Forced oscillations					

		9.7 Resonance and Damping					
B	Waves						
10	Wave Motion	10.1 Waves and energy				2	4.0
		10.2 Transverse & longitudinal	1				
		10.3 Progressive wave equation		1			
		10.4 Wave Intensity					
		10.5 Principle of Superposition					
		10.6 Stationary/standing waves					
11	Sound waves	11.1 Propagation of sound waves				2	4.0
		11.2 Sources of sound	1				
		11.3 Intensity of sound					
		11.4 Beats					
		11.5 Doppler effect		1			
C	Properties of matter						
12	State of Matter	12.1 Solid, liquid, gas				1	2.0
		12.2 Crystalline Solids					
		12.3 F-r curve	1				
		12.4 U-r curve					
13	Deformation of solids	13.1 Stress, strain, Young's Modulus			1	1	2.0
		13.2 F-e graph					
		13.3 Elastic & Plastic Deformation					
		13.4 Tensile strength					
		13.5 Stress-strain graph					
		13.6 Energy stored					
14	Kinetic Theory of Gases	14.1 Kinetic Theory Of Gases		1		2	4.0
		14.2 Root mean square speed					
		14.3 Molecular Kinetic Energy					
		14.4 Degrees of freedom	1				
		14.5 Law of Equipartition of energy					
		14.6 Real & Ideal gas equation					
		14.7 Internal energy of gas					
		14.8 Distribution of molecular speed					
15	Thermodynamics fo Gases	15.1 Heat capacity				2	4.0
		15.2 Work done by gas					
		15.3 First law of thermodynamics					
		15.4 Internal energy of gas		1			
		15.5 Change at constant volume					
		15.6 Change at constant pressure					
		15.7 Isothermal change	1/2				
		15.8 Adiabatic change	1/2				
		15.9 Cyclic process					
16	Thermal Conduction	16.1 Mechanism of thermal conduction				1	2.0
		16.2 Thermal conductivity					
		16.3 Thermal conduction for insulated rod		1			
		16.4 Thermal conduction for uninsulated rod					
		16.5 Determination of thermal conductivity.	1				

E	Electricity & Magnetism						
17	Electrostatics	17.1 Electric field strength, E		1		3	6.0
		17.2 Gauss's law					
		17.3 Motion of charge in uniform electric field					
		17.4 Electric potential, V	1/2				
		17.5 Electric potential energy for a charge and system of charge	1/2				
		17.6 Coulomb force			1		
18	Capacitance	18.1 Parallel plate capacitor				2	4.0
		18.2 Energy stored in capacitor					
		18.3 Capacitor in series & parallel	1				
		18.4 Loss of energy					
		18.5 Charging and discharging		1			
		18.6 Effect of dielectric					
19	Electric conduction	19.1 Mechanism of electric conduction				2	4.0
		19.2 Drift velocity and $I=nAve$	1/2		1/2		
		19.3 Current density, J	1/2				
		19.4 Electric resistivity & conductivity			1/2		
		19.5 Comparison of electric & thermal conduction.					
20	D.C Circuit	20.1 E.m.f and potential difference				2	4.0
		20.2 Simple d.c circuit to find I/V.		1/2			
		20.3 Output and input power					
		20.4 Resistors in series & parallel		1/2			
		20.5 Kirchoff's Law					
		20.6 Shunt & Multiplier	1				
		20.7 Potentiometer					
		20.8 Wheatstone Bridge					
21	Magnetic fields	21.1 Force on a straight conductor carrying current				3	6.0
		21.2 Force on moving charge		1			
		21.3 Forces between two parallel straight wires carrying current					
		21.4 Magnetic field due to current-carrying conductor / torque on a coil	1	1			
		21.5 Hall Effect					
		21.6 Mass spectrometer, q/m					
22	Electromagnetic Induction	22.1 Simple experiments to illustrate electromagnetic induction				1	2.0
		22.2 Laws of electromagnetic induction					
		22.3 Magnitude of induced e.m.f in conductors.					
		22.4 Self & mutual induction			1		
		22.5 Energy stored in an inductor					
		22.6 Transformer					
		22.7 D.C Motor & back e.m.f					
		22.8 Role of eddy current					

23	Alternating current	23.1 R.m.s value of a.c				1	2.0
		23.2 Characteristics of a.c through R,C,L		1			
		23.3 A.C rectification					
24	Electronics	24.1 Characteristic of ideal op-amp in open loop	1			1	2.0
		24.2 Transfer characteric and frequency response graphs					
		24.3 Inverting and non inverting op-amp in open loop					
		24.4 Inverting and non inverting with negative feedback.					
		24.5 Uses of op-amp					
F	Optics						
25	Electromagnetic waves	25.1 Electromagnetic wave spectrum					
		25.2 $c = \frac{1}{\sqrt{\mu_0 \epsilon_0}}$					
26	Geometrical optics	26.1 Formation of images in curved mirrors-ray diagram				1	2.0
		26.2 $r=2f$ and $\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$					
		26.3 Refractive index					
		26.4 Refraction at single curved surface. $\frac{n_1}{u} + \frac{n_2}{v} = \frac{n_2-n_1}{r}$					
		26.5 Thin lens formula and lens maker equation	1				
		26.6 Magnification					
27	Physical optics	27.1 Huygen's principle				4	8.0
		27.2 Phase difference and optical path difference	1				
		27.3 Superposition & Interference					
		27.4 Conditions for constructive and destructive interference in o.p.d					
		27.5 Young's Double slit		1			
		27.6 Thin Film interference					
		27.7 Air wedge interference			1		
		27.8 Single slit diffraction					
		27.9 Diffraction grating					
		27.10 Polarization	1				
G	Quantum mechanics						
28	Photons & Wave-particle duality	28.1 Energy of a photon				1	2.0
		28.2 Wave-particle duality / De Broglie's wavelength					
		28.3 Photoelectric effect					
		28.4 X-ray production & spectra	1				
		28.5 X-ray diffraction					
H	Atomic Physics						
29	Atomic structure of an atom	29.1 Alpha scattering experiment-existence of nucleus					
		29.2 Bohr's Model & Energy levels					

		29.3 Electron transition and production of line spectrum				2	2.0
		29.4 Laser production	1				
I	Nuclear Physics						
30	Radioactivity	30.1 Natural radioactivity and decay law	1			1	2.0
		30.2 Decay constant and half-life			1		
		30.3 Carbon dating					
		30.4 Uses / danger of radioactivity					
31	Nuclear Reaction	31.1 Proton number and nucleon number				1	2.0
		31.2 Mass of nucleus in a.m.u					
		31.3 Loss of rest mass and binding energy	1				
		31.4 Isotopes					
		31.5 Nuclear reaction-fission and fusion					
		31.6 Energy released during nuclear reaction					
32	Elementary particles	32.1 Basic forces					
		32.2 Neutrino					
		32.3 Hadrons and leptons					
		32.4 Quarks					
		Total	25	15	10	50	100%