## GENERAL CERTIFICATE OF EDUCATION BOARD

The velocity-time graph for an object in moreon is shown in figure

Technical and Vocational Education Examination

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## INTERMEDIATE LEVEL

Specialty Name and Acronym	All Indu	ustrial Specialties
Subject Title		ering Science
Subject Code No.	5155	01 02 04 04 7500 50 75
Paper No.	2	Fleure 1
	10	Betermine:

The lora time taken for the journey. The maximum velocity reached. The acceleration during the first 20 seconds (SHERRE)

Duration: Two and a Half Hours and a swork & saught

## INSTRUCTIONS TO CANDIDATES

This Paper Has EIGHT (8) Questions. Answer Any SIX (6).

All Questions carry equal marks.

Paper Two carries 60% of the total mark.

Where necessary, take the value of the acceleration due to gravity as 10 m/s<sup>2</sup> and  $\pi$  as  $\frac{22}{\pi}$ 

Calculators are allowed.

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## You are reminded of the necessity for good English and orderly presentation in your answers.

(I mark) What is the velocity ratio of the pulley system?

If a load of 60 M is raised through a vertical distance of 1 m by an effort of 20 M, calculate:

(2 marks) (ii) The mechanical advantage of the system.

(2 marks) the efficiency of the machine. (Miram S) (c) Give two reasons why the efficiency of the system is less than 100%.

(2 marks) State Ohm's law. (1) (E) (Z murks)

State two factors that affect the resistance of a conductor.

Study the circuit in figure 3 and answer the questions that follow.

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Turn Over

1. (a) The velocity-time graph for an object in motion is shown in figure 1.

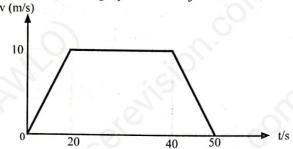


Figure 1

Deter	mine:	
(i)	The total time taken for the journey.	(1 mark)
(ii)	The maximum velocity reached.	(1 mark)
(iii)	The acceleration during the first 20 seconds.	(2 marks)
	The total distance travelled.	(2 marks)

(b) Figure 2 shows a block and tackle pulley system.

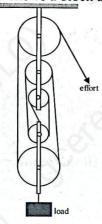


Figure 2

(i) What is the velocity ratio of the pulley system? (1 mark)

If a load of 60 N is raised through a vertical distance of 1 m by an effort of 20 N, calculate;

(ii) The mechanical advantage of the system. (2 marks)

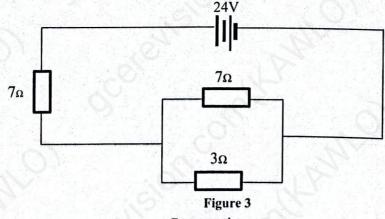
(iii) The distance moved by the effort. (2 marks)

(iv) The efficiency of the machine. (2 marks)

(c) Give two reasons why the efficiency of the system is less than 100%. (2 marks)

2. (a) (i) State Ohm's law. (2 marks)
(ii) State two factors that affect the resistance of a conductor. (2 marks)

(b) Study the circuit in figure 3 and answer the questions that follow.



Go on to the next page

	Cuit	culate;	(4) SAMPLE SEE STATE OF SECTION ASSESSMENT	OGN YUNGHA	192000000000000000000000000000000000000	
	(i)	The total resistance in	n the circuit.	Applied energy		(2 marks)
	(ii)	The potential differen	nce across the 7	$\Omega$ resistor in the parallel section	nest repoll solves	(2 marks)
	(iii)	The current through	the 3 $\Omega$ resistor	A CONTRACTOR OF THE PROPERTY O		(1 mark)
			.6		V 1714	mark)
(c)	(i)	Give one advantage of			Hoose	(1 mark)
	(ii)	Name a device used t	to store electric	charges and draw its circuit syn	nbol agings	(2 marks)
	(iii)	In pre-paid meters in	stalled by ENE	O, a household buys energy before	ore consumption I	low many
		units (KWh) will the	house hold rece	eive after buying energy worth 7	500 frs. (1 unit cos	sts 75 frs)
			49 m high.	ss 200 de la el trop of a chiff	An object of ma	(2 marks)
_ 1 - Auto 5			er at that height	the potential energy of the obje-	(i) Calculate	
3. (a)	(i)	Give two properties	of plastics whic	h make them useful as engineer	ing materials.	(2 marks)
	(ii)	What is recycling of	plastics?	tiln will be repoted of the all of the	Current de Colois	(1 mark)
(2 marks)	(iii)	What advantage does	s recycling of pl	lastics have on the environment	(iii) What is	(1 mark)
auto-1	int Word	A Transaction			(111)	
(b)	Cop	y and complete the tal	ole by selecting	a suitable metal from the box be	elow, giving reason	n in each
EARING E	case	Lenterak reprint nabal	устать ЯГего в	asod (parint a rush manner et a	scapelland on from	the leph
		Aluminium, Gold, M	agnesium Conne	ar Iron Lithium		
(2 monks)	1	Attuminatin, Gold, 191	agnesium, coppe	newal senergy infinite , non ,	(i) What is re	(Danais)
(dram f)	1100000	.) The sware section	surce. I sall to a	example of renewable energy so	(ii) Give one	(2 mark
(I mark)	15 (8)	Uses	Metal	Property of material r	esponsible for its	use. (b)
		rrings	William State State	CR is introduction of states.		id mark
	Ax					
1 ( )	Bo	ody work of aircraft	STREET THE VE	HER RESIDENCE AND A SHIPPER		
			Carlo	and the state of t	District Control of the Control of t	Control of the second of the s
			Hime pel any	Topero among the section sections and	Jan	(6 marks)
(c)	(i)	State Hooke's law.	en me pel acc	Se via A constante on the Se		(6 marks)
(c)	(i) (ii)		ision graph for	a material that obeys Hooke's la	w for loads rangin	(1 mark)
(c)			ision graph for	a material that obeys Hooke's la	w for loads rangin	(1 mark) g up to the
(c)		Sketch a force -exten	ision graph for	a material that obeys Hooke's la	w for loads rangin	(1 mark)
(c) (dram ()		Sketch a force –extenelastic limit.	lar eliente	e sregiv	noun make an orange pakenanta anno saturnal	(1 mark) g up to the (2 marks)
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(c)	(ii)	Sketch a force – extended elastic limit.  The length of a wire to 0.03 kg is suspended the additional mass of	that obeys Hook on it. The lengt	ke's law increases from 80 mm thincreases to 94 mm, when and	to 83 mm when a rother mass is added	(1 mark) g up to the (2 marks) mass of
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from 25 °C to 39 °C to 5 minutes. If the specific heat apacity of the metal is 521.1 Lyc.

voors from one of ma cit

Calculate the mass in of the block

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edines (.)

State the energy transformation carried out by each of the transducers in the following table: 5. (4 marks)

Transducer	Energy transformation		
	Initial energy	Final useful energy	
Example: House fan	Electrical	Kinetic see on promiting his	
Electric boiler	.(0	through the 3 M resistor.	
Battery	.79,		
Solar cell	3	DOMESTIC TO SERVER	
Car engine	storia eti maintera 20)	indication state characters.	

affer onying energy worth P.46 Fee H anic An object of mass 200 kg is at the top of a cliff 45 m high. (b) (2 marks) Calculate the potential energy of the object at that height. (ii) What happens to the potential energy as the object falls? (1 mark) (2 mark When is recycling of plastic Suppose the object falls to the bottom of the cliff; What is the velocity with which it hits the ground? (2 marks) State one form of energy to which the kinetic energy is transformed when the ball hits the (iv) (1 mark) ground? Vermestual Copper, Iron, What is renewable energy? (2 marks) (c) (i) (1 mark) (ii) Give one example of renewable energy source. (1 mark) Identify the safety symbols A and B in figure 4 (F. 14 (b))

of the a force excession graph for a magnal that obeys Hooke's law A or load ranging up to the

Figure 4

(ii) What security measure would you take when you see the safety symbol B? is suspended on it. The length increases to 94 mm, when another mass is added to it. Find

Figure 5 shows the cooling curve of a 0.8 kg mass of gas at 115 °C loosing heat at a constant rate.

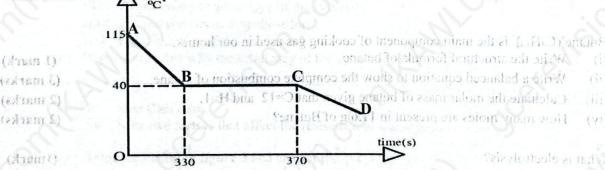


Figure 5 and anisu baselettal vas electrolyzed using inc. 5 spuggs.

(i) What is the physical state represented by each of the regions AB and CD of the cooling curve?

State the different ions present in the Pageon.

The mumber of Landays used What is the boiling point of the substance?

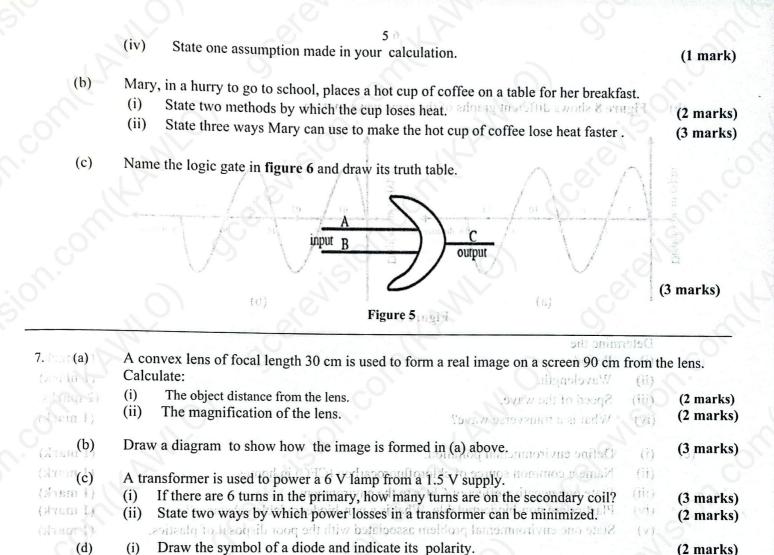
(2 marks) (1 mark)

An electric heater rated 24 W was used in raising the temperature of a metallic block of mass m from 25 °C to 39 °C in 5 minutes. If the specific heat capacity of the metal is 571 J/kgk. Calculate the mass m of the block.

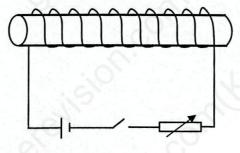
(3 marks)

(Paraera C)

(PAYEM S)



8. (a) Figure 7 shows a solenoid wound on a cardboard tube. The ends of the solenoid are connected to a DC source through a rheostat and switch.



State one use of the diode.

Figure 7

(i) Copy the figure and indicate the following:

-The direction of current,

- The polarity and

- The magnetic field lines.

(ii) State one method of making the field stronger.

(1 mark)

(1 mark)

(1 mark)