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ಕರ್ನಾಟಕ ಪ್ರೌಢ ಶಿಕ್ಷಣ ಪರೀಕ್ಷಾ ಮಂಡಳಿ, ಮಲ್ಲೇಶ್ವರಂ, ಬೆಂಗಳೂರು – 560 003

**KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, MALLESWARAM,
BANGALORE – 560 003**

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಮಾರ್ಚ್ / ಏಪ್ರಿಲ್ — 2020

S. S. L. C. EXAMINATION, MARCH/APRIL, 2020

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 30. 03. 2020]

ಸಂಕೇತ ಸಂಖ್ಯೆ : **83-E (Phy)**

Date : 30. 03. 2020]

CODE NO. : **83-E (Phy)**

ವಿಷಯ : ವಿಜ್ಞಾನ

Subject : SCIENCE

(ಭೌತಶಾಸ್ತ್ರ / Physics)

(ಹಳೆ ಪಠ್ಯಕ್ರಮ / Old Syllabus)

(ಪುನರಾವರ್ತಿತ ಖಾಸಗಿ ಅಭ್ಯರ್ಥಿ / Private Repeater)

(ಇಂಗ್ಲಿಷ್ ಭಾಷಾಂತರ / English Version)


[ಗರಿಷ್ಠ ಅಂಕಗಳು : 100

[Max. Marks : 100

Qn. Nos.	Value Points	Total
3.	A ship sends ultrasonic sound. This sound returns from the seabed and is detected after 6s. If the speed of ultrasonic sound through seawater is 1.5 kms^{-1} , the depth of the sea is (A) 5 km (B) 5.5 km (C) 3.5 km (D) 4.5 km. Ans. : (D) — 4.5 km.	1

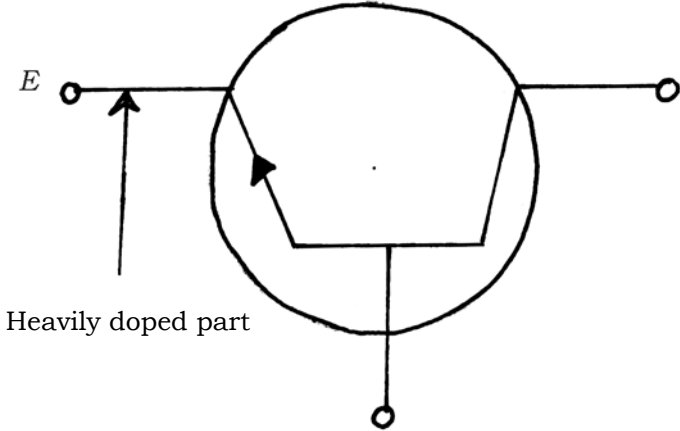
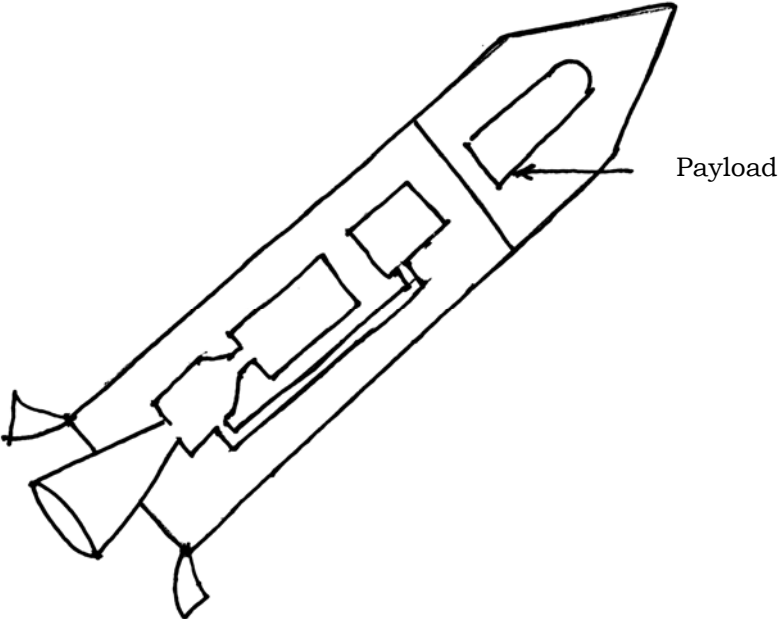
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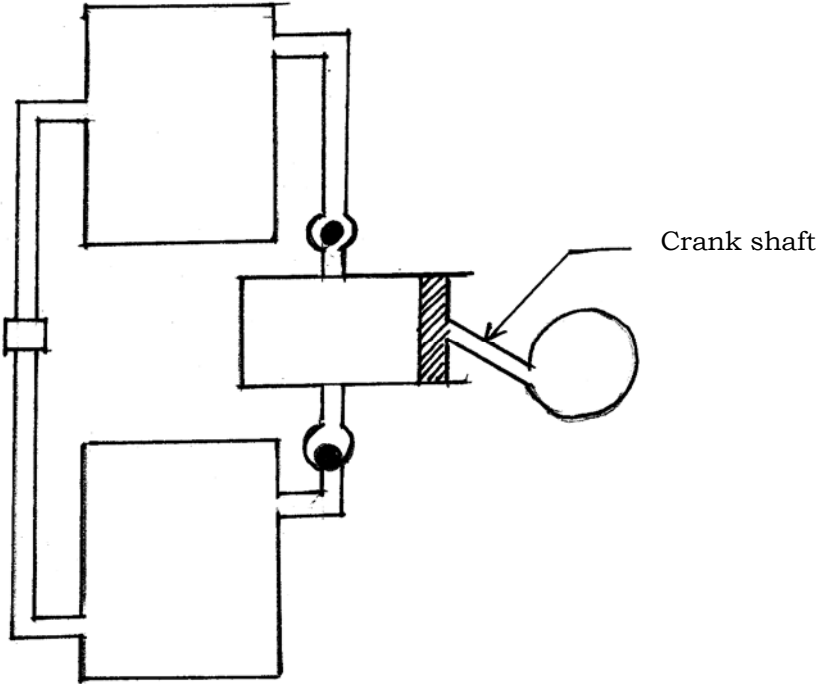
Qn. Nos.	Value Points	Total
5.	<p>A device used to convert alternating current into direct current is</p> <p>(A) transistor (B) diode</p> <p>(C) dynamo (D) motor.</p> <p>Ans. :</p> <p>(B) — diode</p>	1
6.	<p>With reference to the working of a rocket, in the equation $RV_{ex} = Ma$, R stands for</p> <p>(A) resistance (B) acceleration</p> <p>(C) rate of fuel consumption (D) mass.</p> <p>Ans. :</p> <p>(C) — rate of fuel consumption</p>	1
8.	<p>Biofuel is ecofriendly because, it</p> <p>(A) increases the temperature of the atmosphere</p> <p>(B) produces less amount of carbon dioxide when burnt</p> <p>(C) is a fossil fuel</p> <p>(D) is a conventional source of energy.</p> <p>Ans. :</p> <p>(B) — produces less amount of carbon dioxide when burnt</p>	1
12.	<p>What is a solar cell ?</p> <p>Ans. :</p> <p>A device which converts solar energy into electrical energy.</p>	1
15.	<p>Draw the symbolic representation of a transformer.</p> <p>Ans. :</p> 	1

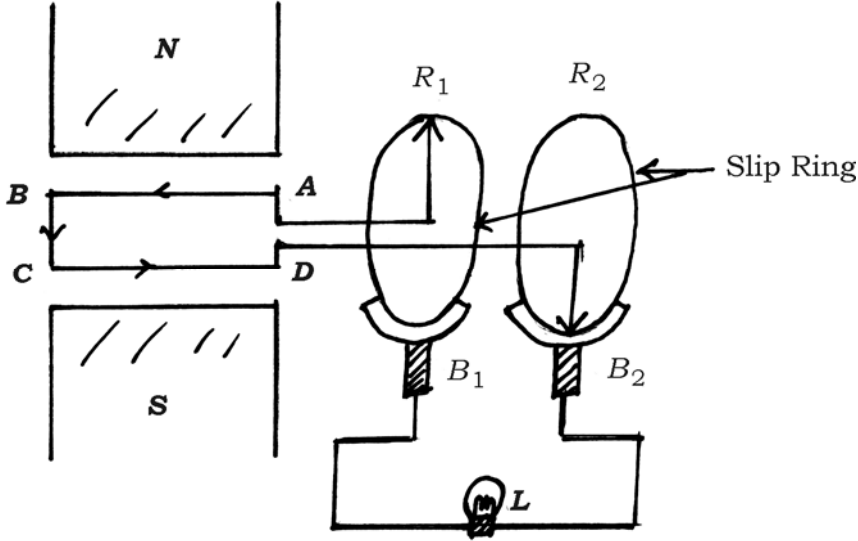
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16.	<p>What is nuclear fission reaction ?</p> <p><i>Ans. :</i></p> <p>The process of splitting a heavy nucleus into two medium sized nuclei by bombarding it by a neutron along with the release of enormous amount of energy and 2-3 neutrons is called nuclear fission.</p>	1
18.	<p>Mention the important features of a star which is in white dwarf stage.</p> <p><i>Ans. :</i></p> <p>★ The increase in temperature and pressure prevents further collapse. $\frac{1}{2}$</p> <p>★ Due to very high temperature, the star glows with white light of high frequency. $\frac{1}{2}$</p>	1
20.	<p>A bus which is in clutch gear produces waves of frequency 33 Hz. If the velocity of waves is 330 ms^{-1}, then find the wavelength of the waves.</p> <p><i>Ans. :</i></p> <p>$n = 33 \text{ Hz}$</p> <p>$v = 330 \text{ ms}^{-1}$</p> <p>$\lambda = ?$</p> <p>$v = n\lambda$</p> <p>$\lambda = \frac{v}{n}$</p> <p>$= \frac{330}{33}$</p> <p>$\lambda = 10 \text{ m.}$</p>	2
23.	<p>Explain the functions of the following components in a nuclear power reactor :</p> <p>a) Control rods</p> <p>b) Moderator.</p> <p style="text-align: center;">OR</p> <p>Write two differences between chemical reactions and nuclear reactions.</p>	

Qn. Nos.	Value Points		Total																		
	<p><i>Ans. :</i></p> <p>a) ★ To shut down the reactor by inserting the rods sufficiently deep inside the nuclear reactor</p> <p>★ to increase or decrease the rate of reaction</p> <p>★ to absorb neutrons efficiently. (any one point) 1</p> <p>b) To slow down the neutrons emitted in the fission process. 1</p>		2																		
	OR																				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="width: 45%; text-align: center;"><i>Chemical Reactions</i></th> <th style="width: 50%; text-align: center;"><i>Nuclear Reactions</i></th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">i)</td> <td>Valence electrons of the atoms participate in the reaction.</td> <td>Electrons of an atom have no role to play in nuclear reactions.</td> </tr> <tr> <td style="text-align: center;">ii)</td> <td>Nucleus of an atom does not undergo any change</td> <td>Nucleus of the atoms undergo a change</td> </tr> <tr> <td style="text-align: center;">iii)</td> <td>Products are predictable</td> <td>Nuclear reaction is a chance reaction. The products depend upon conditions</td> </tr> <tr> <td style="text-align: center;">iv)</td> <td>Mass is conserved</td> <td>A small amount of mass is converted into energy</td> </tr> <tr> <td style="text-align: center;">v)</td> <td>Inter conversion of compounds to elements or elements to compounds take place</td> <td>Production of new elements and isotopes takes place which is called transmutation</td> </tr> </tbody> </table>			<i>Chemical Reactions</i>	<i>Nuclear Reactions</i>	i)	Valence electrons of the atoms participate in the reaction.	Electrons of an atom have no role to play in nuclear reactions.	ii)	Nucleus of an atom does not undergo any change	Nucleus of the atoms undergo a change	iii)	Products are predictable	Nuclear reaction is a chance reaction. The products depend upon conditions	iv)	Mass is conserved	A small amount of mass is converted into energy	v)	Inter conversion of compounds to elements or elements to compounds take place	Production of new elements and isotopes takes place which is called transmutation	
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	(Any two points) 1 + 1		2																		
26.	<p>Draw the circuit symbol of an <i>n-p-n</i> transistor. Label the heavily doped part.</p> <p><i>Ans. :</i></p>																				

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	 <p style="text-align: center;"><i>n-p-n</i> transistor</p>	<p style="text-align: right;">Diagram — $1\frac{1}{2}$ Label — $\frac{1}{2}$ 2</p>
<p>29. Draw the diagram of a single staged rocket and label payload. Ans. :</p>	 <p style="text-align: center;"><i>A Single Staged Rocket</i></p>	<p style="text-align: right;">Diagram — $1\frac{1}{2}$ Labelling — $\frac{1}{2}$ 2</p>

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33.	<p>An astronomer observes two sources of light A and B continuously. He identifies that A shows red shift and B shows blue shift. What is the reason for this ? Analyse.</p> <p><i>Ans. :</i></p> <ul style="list-style-type: none"> ★ Source of light A moves away from the astronomer. $\frac{1}{2}$ ★ There will be an apparent decrease in the frequency. $\frac{1}{2}$ ★ Source of light B moves towards the astronomer. $\frac{1}{2}$ ★ There will be an apparent increase in the frequency. $\frac{1}{2}$ <p>[OR one mark can be given if Doppler Effect is written]</p>	2
37.	<p>How is a protostar formed ? Explain.</p> <p><i>Ans. :</i></p> <ul style="list-style-type: none"> ★ The interstellar space contains huge gaseous clouds (rarefied hydrogen), which contract due to their mutual attraction. $\frac{1}{2}$ ★ As the cloud contracts, there will be increase in density which leads to increase in pressure. $\frac{1}{2}$ ★ Gradually there will be aggregation of matter with the spherical mass at the centre of the cloud. $\frac{1}{2}$ ★ The force acting is the gravitational pull towards the centre, which makes the central portion alone accounts for 99% of the mass of the cloud. The sphere formed is the protostar. $\frac{1}{2}$ 	2

Qn. Nos.	Value Points	Total
<p>40.</p> <p>Draw the diagram showing the expansion stroke of a steam engine and label crankshaft.</p> <p>Ans. :</p>	 <p style="text-align: center;">Expansion Stroke</p> <p style="text-align: right;">Crank shaft</p> <p style="text-align: right;">Drawing — $1\frac{1}{2}$</p> <p style="text-align: right;">Labelling — $\frac{1}{2}$</p>	<p style="text-align: center;">2</p>
<p>43.</p> <p>Draw the diagram of an AC dynamo and label slip rings.</p> <p>Ans. :</p>		

Qn. Nos.	Value Points	Total
46.	<div style="text-align: center;">  </div> <p style="text-align: right;">Drawing — $1\frac{1}{2}$</p> <p style="text-align: right;">Labelling — $\frac{1}{2}$</p> <p style="text-align: right;">2</p> <p>a) If an AC source of 250 volts has to be stepped down to 10 volts, then what should be the turns ratio of the primary coil and secondary coil ?</p> <p>b) Mention the factors on which the induced <i>e.m.f.</i> in the secondary coil of a transformer depend.</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">Explain Faraday's experiment of electromagnetic induction.</p> <p>Ans. :</p> <p>a) $V_p = 250$</p> <p>$V_s = 10$</p> <p>$N_s : N_p = ?$</p> $\frac{V_s}{V_p} = \frac{N_s}{N_p} \quad \frac{1}{2}$ $\frac{10}{250} = \frac{N_s}{N_p}$ $\frac{N_s}{N_p} = \frac{1}{25} \quad \text{OR} \quad 1 : 25 \quad \frac{1}{2}$	

Qn. Nos.	Value Points	Total
	b) <ul style="list-style-type: none"> ★ <i>e.m.f.</i> in the primary coil, $\frac{1}{2}$ ★ number of turns in the primary coil, $\frac{1}{2}$ ★ number of turns in the secondary coil, $\frac{1}{2}$ ★ the core material. $\frac{1}{2}$ <p style="text-align: center;">OR</p> <p><i>Materials taken</i> : Powerful bar magnet, card board tube, galvanometer, copper wire. $\frac{1}{2}$</p> <ul style="list-style-type: none"> ★ Faraday wound a copper wire around a card board tube and connected its two ends to a galvanometer. $\frac{1}{2}$ ★ When bar magnet is pushed inside the coil, needle of the galvanometer deflected to one side. When the bar magnet was taken out of the coil, the needle of the galvanometer deflected in opposite side. $\frac{1}{2}$ ★ When the magnet and the coil remained stationary, there was no deflection in the galvanometer. $\frac{1}{2}$ ★ When magnet is kept stationary and coil is moved nearer, the needle of the galvanometer deflects to one side. When the coil moved in the opposite direction, the needle of galvanometer deflected in opposite side. $\frac{1}{2}$ ★ When the magnet is pushed inside the coil or taken out from the coil very quickly, the needle of the galvanometer move quickly to both the sides. $\frac{1}{2}$ 	3
50.	a) Write any three differences between diesel engine and petrol engine. b) 'An engine is 40% efficient.' What is the meaning of this statement ? <p style="text-align: center;">OR</p> Explain the expansion stroke and the exhaust stroke in the working of a petrol engine. <i>Ans. :</i>	3

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	<p>a)</p> <table border="1" data-bbox="261 367 1321 1211"> <thead> <tr> <th data-bbox="261 367 794 434"><i>Diesel Engine</i></th> <th data-bbox="794 367 1321 434"><i>Petrol Engine</i></th> </tr> </thead> <tbody> <tr> <td data-bbox="261 434 794 555">★ Diesel engines are compression ignition engines</td> <td data-bbox="794 434 1321 555">★ Petrol engines are spark ignition engines</td> </tr> <tr> <td data-bbox="261 555 794 622">★ Spark plug is not required</td> <td data-bbox="794 555 1321 622">★ Require spark plug</td> </tr> <tr> <td data-bbox="261 622 794 743">★ Micelles of diesel are used as fuel</td> <td data-bbox="794 622 1321 743">★ Petrol vapour is used as fuel</td> </tr> <tr> <td data-bbox="261 743 794 864">★ The cost of diesel is comparatively less</td> <td data-bbox="794 743 1321 864">★ The cost of petrol is comparatively high</td> </tr> <tr> <td data-bbox="261 864 794 1030">★ Expansion against constant pressure</td> <td data-bbox="794 864 1321 1030">★ Expansion of gaseous products with pressure impulse</td> </tr> <tr> <td data-bbox="261 1030 794 1151">★ Efficiency is comparatively high</td> <td data-bbox="794 1030 1321 1151">★ Efficiency is comparatively less</td> </tr> <tr> <td data-bbox="261 1151 794 1211">★ Pollution intensity is high</td> <td data-bbox="794 1151 1321 1211">★ Pollution intensity is low</td> </tr> </tbody> </table> <p style="text-align: right;">(Any three points each) $6 \times \frac{1}{2}$</p> <p>b) It means, when 100 J of energy is provided to an engine, 40 J of heat is converted into useful work. 1</p> <p style="text-align: center;">OR</p> <p><i>Expansion stroke :</i></p> <ul style="list-style-type: none"> ★ Fuel burns quickly producing heat and gaseous products. $\frac{1}{2}$ ★ Carbon dioxide, carbon monoxide, water vapour and carbon particles are formed. $\frac{1}{2}$ ★ Gaseous products expand suddenly $\frac{1}{2}$ ★ Piston is pushed outwards with great force. $\frac{1}{2}$ 	<i>Diesel Engine</i>	<i>Petrol Engine</i>	★ Diesel engines are compression ignition engines	★ Petrol engines are spark ignition engines	★ Spark plug is not required	★ Require spark plug	★ Micelles of diesel are used as fuel	★ Petrol vapour is used as fuel	★ The cost of diesel is comparatively less	★ The cost of petrol is comparatively high	★ Expansion against constant pressure	★ Expansion of gaseous products with pressure impulse	★ Efficiency is comparatively high	★ Efficiency is comparatively less	★ Pollution intensity is high	★ Pollution intensity is low	4
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	<i>Exhaust stroke :</i> ★ The outlet valve opens ★ Piston moves back ★ The product of combustion gases are pushed out of the cylinder through the exhaust valve.	$\frac{1}{2}$ $\frac{1}{2}$ 1 4