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

KARNATAKA SECONDARY EDUCATION EXAMINATION BOARD, MALLESHWARAM, BANGALORE – 560 003

ಎಸ್.ಎಸ್.ಎಲ್.ಸಿ. ಪರೀಕ್ಷೆ, ಜೂನ್ / ಜುಲೈ, 2022

S.S.L.C. EXAMINATION, JUNE / JULY, 2022

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 02. 07. 2022] ಸಂಕೇತ ಸಂಖ್ಯೆ : **71**

Date : 02. 07. 2022] **CODE NO. : 71**

ವಿಷಯ : ಎಲಿಮೆಂಟ್ಸ್ ಆಫ್ ಮೆಕ್ಯಾನಿಕಲ್ ಅಂಡ್ ಎಲೆಕ್ಟ್ರಿಕಲ್ ಇಂಜಿನಿಯರಿಂಗ್ - 2

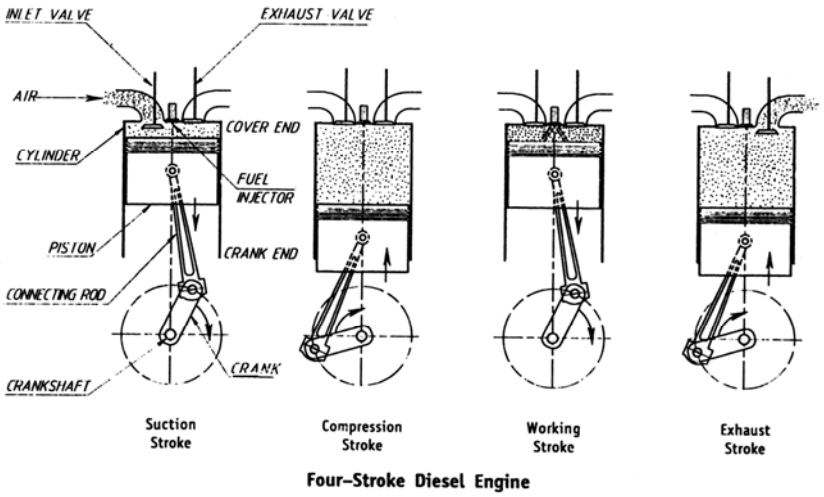
Subject : ELEMENTS OF MECHANICAL AND ELECTRICAL ENGINEERING-2

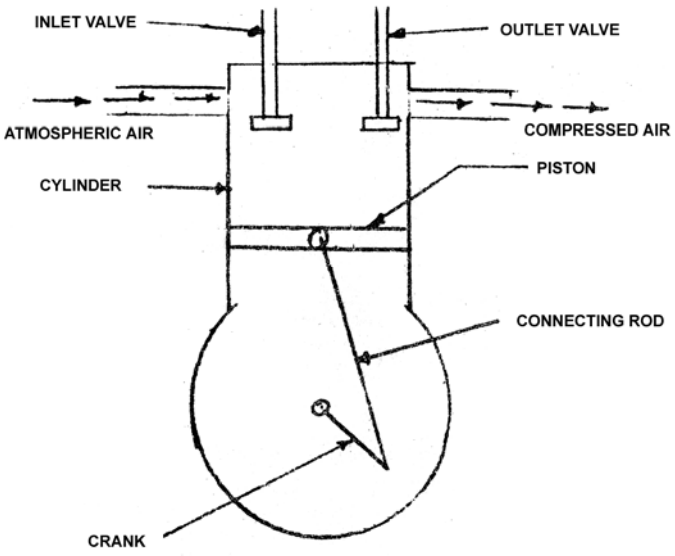
(ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ/ Regular Repeater)

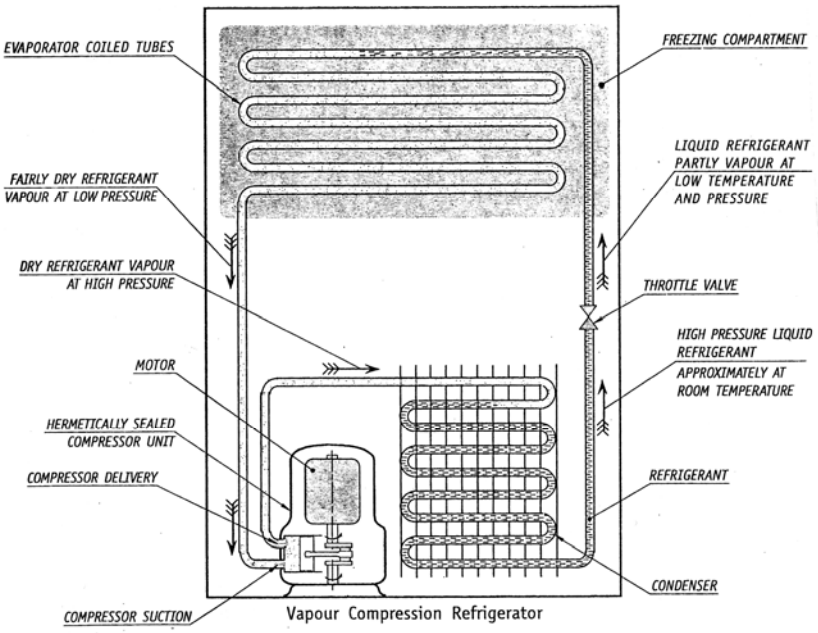
[ಗರಿಷ್ಠ ಅಂಕಗಳು : **100**

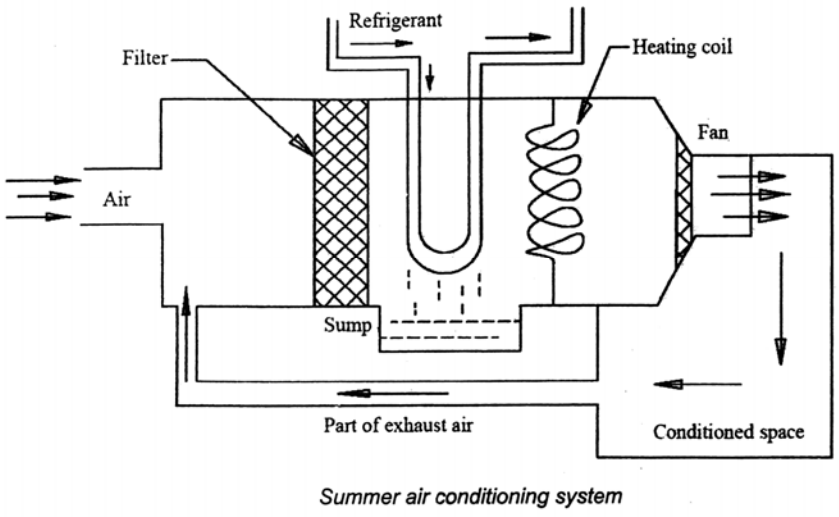
[Max. Marks : 100

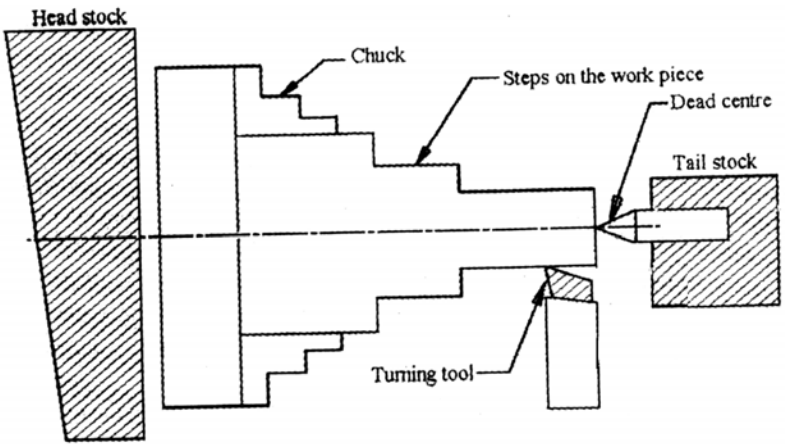
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
		SECTION - A	
1.	a)	Define E.C. engine. 2 *Ans.* E. C. Engine The combustion takes place outside the engine cylinder is called external combustion engine.	2
	b)	Explain the function of connecting rod in an internal combustion engine. 3 *Ans.* Connecting rod is a link that connects the piston and the crankshaft by means of Pin joints. It converts the rectilinear motion of the piston into rotary motion of the crankshaft.	3

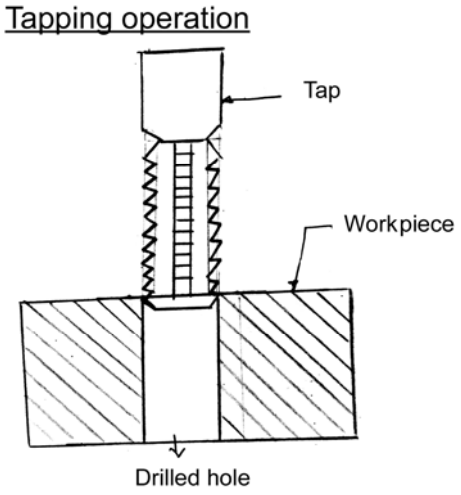
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw a neat sketch of four-stroke diesel engine and label the parts. 5 *Ans.* Four-Stroke Diesel Engine  Four–Stroke Diesel Engine Sketch - 4 Parts - 1	5
2.	a)	Define air compressor. 2 *Ans.* Air compressors are power absorbing devices which are used to increase the pressure of air at least by two times.	2
	b)	Write the classification of air compressor. 3 *Ans.* Air-compressors are classified as i) Reciprocating air-compressor ii) Centrifugal air-compressor.	3

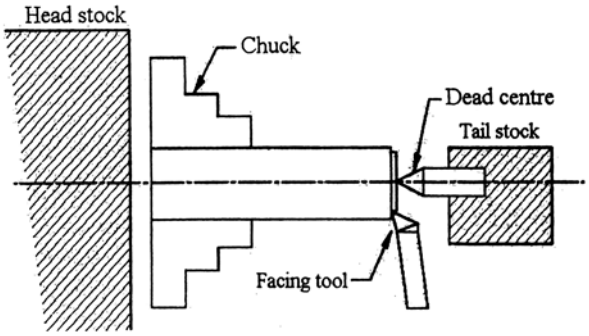
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw a neat sketch of reciprocating air compressor and label the parts. 5 *Ans.* Air Compressor  **Reciprocating Air Compressor** Sketch = 4 Parts = 1	5
3.	a)	What is a refrigerant ? 2 *Ans.* In a refrigerator medium called refrigerant continuously extracts the heat from the space within the refrigerator which is to kept cool at temp. less than the atmosphere.	2
	b)	What are the desirable properties required for a good refrigerant ? 3 *Ans.* Properties : — Thermodynamic products — Physical properties — Safe working properties — Other properties (COP, odour, leak)	3

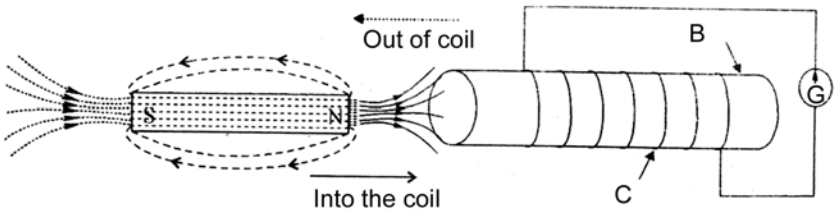
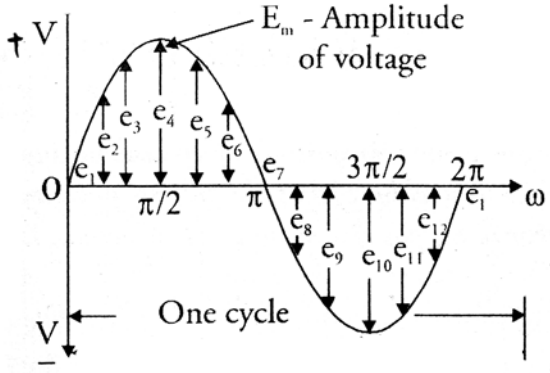
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw a neat sketch of vapour compression refrigerator and label the parts. 5 *Ans.* Vapour Compression Refrigerator  Vapour Compression Refrigerator Sketch - 4 Parts - 1	5
4.	a)	List the important parts of refrigeration system. 2 *Ans.* Parts of refrigerator — Evaporator — Condenser — Circulating system — Expansion device — Compressor	2
	b)	Mention the uses of air compressor. 3 *Ans.* Uses of Air-compressor — Used for washing vehicles — Used for inflating tubes — Used in spray painting — Used for pneumatic drives — Used for cooling buildings	3

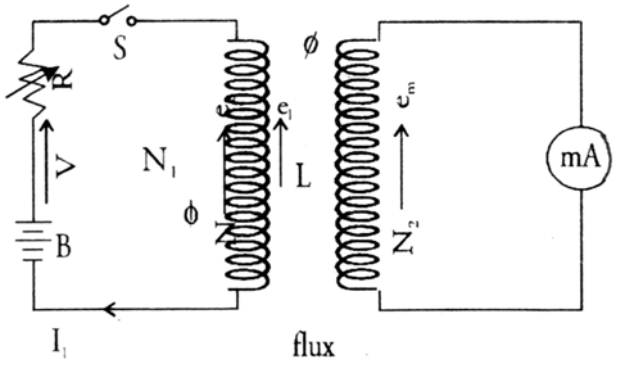
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw a neat sketch of summer air-conditioning system and label the parts. 5 *Ans.* <u>Summer air-conditioning</u>  *Summer air conditioning system* Sketch - 4 Parts - 1	5
5.	a)	Define taper. 2 *Ans.* <u>Taper</u> Taper is defined as a uniform increase or decrease in diameter of a workpiece measured along its length.	2
	b)	What are the specifications required to purchase a lathe ? 3 *Ans.* <u>Specification of Lathe</u> — Length between the two centres — Height of the centre — Length of bed — Swing diameter — Capacity of lathe — Bed size — Speed of lathe — Floor space — Spindle size	3

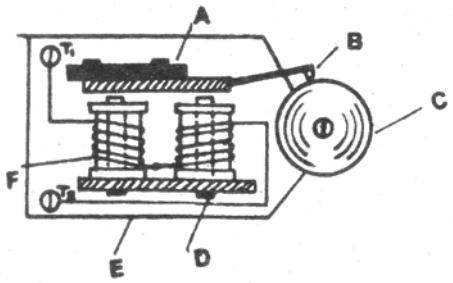
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	With a neat sketch explain step turning operation carried out in a lathe. 5 *Ans.* Step Turning Operation  Removal of extra material from the different diameters of the same job by turning is called step turning.	5
		OR	
	a)	Define drilling. 2 *Ans.* Drilling is the operation used to produce cylindrical holes in a workpiece. The tool used for this operation is called drilling tool or drill bit.	2
	b)	Mention the different operations carried out in a drilling machine. 3 *Ans.* Drilling operations — Drilling — Reaming — Boring — Counter boring — Counter sinking — Spot facing — Tapping — Tree panning	3

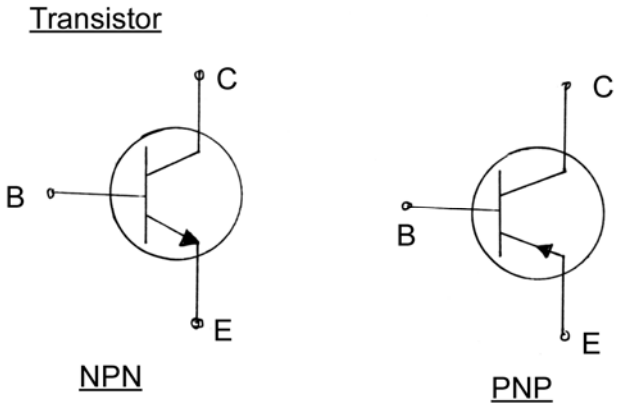
Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	With a neat sketch explain tapping operation carried out in a drilling machine. 5 *Ans.*  Tapping operation is used for internal thread cutting for already drilled hole.	5
6.	a)	Classify the IC engines according to the position of cylinders. 2 *Ans.* <u>Position of cylinder</u> — Horizontal engine — Vertical engine — Vee engine — Bi-fuel engine — Opposed cylinder engine — Radial engine	2
	b)	Explain the use of piston rings in an internal combustion engine. 3 *Ans.* <u>Piston rings</u> Piston rings maintain a gas-tight joint between the piston and the cylinder while the piston is reciprocating in the cylinder. These are made of metal.	3

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	With a neat sketch, explain facing operation carried out in a lathe. 5 *Ans.* Facing Operation  *Facing operation* Sketch - 4 Parts - 1 Facing operation is defined as an operation performed on the lathe to generate either flat surface or shoulders at the end of the workpiece.	5
		SECTION - B	
7.	a)	List the types of induced *e.m.f.* 2 *Ans.* Induced *e.m.f.* Statically Induced *e.m.f.* / Dynamically Induced *e.m.f.* Self-induced *e.m.f.* / Mutually induced *e.m.f.*	2
	b)	Explain the term 'self-induced *e.m.f.*' 3 *Ans.* The *e.m.f.* induced in a coil, due to the changing flux created by the current flowing through the same coil, is called self-induced *e.m.f.* *e.g.* Choke.	3

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw a neat sketch of electromagnetic induction and label the parts. 5 *Ans.* Electromagnetic Induction  B - Bobbin N - North pole C - Coil S - South pole G - Galvanometer Sketch - 4 Parts - 1	5
8.	a)	What is meant by AC ? 2 *Ans.* A.C. means alternating current which changes its magnitude and direction every time is called *a.c.*	2
	b)	Describe electrical power and also mention its SI unit. 3 *Ans.* Power The rate at which electrical energy is expended or electrical work is done is called electrical power. S.I. unit of electrical power is 'Watt' or 'Kilowatt'.	3
	c)	Draw a neat diagram of sine wave and mark the following : i) Amplitude ii) Cycle. *Ans.* Sine wave  + V = Positive voltage – V = Negative voltage $\frac{\pi}{2} = 90°$, $\pi = 180°$, $3\frac{\pi}{2} = 270°$, $2\pi = 360°$ Sketch - 4 Parts - 1	5

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
9.	a)	Define the term 'electromagnetic induction'. 2 *Ans.* The phenomenon by which an *e.m.f.* is induced in a coil, due to the change in the flux linking with the coil, is called electromagnetic induction.	2
	b)	State Fleming's Right Hand Rule. 3 *Ans.* According to Fleming's Right Hand Rule, sketch forefinger, middle finger and thumb at right angle to each other. The forefinger indicates the direction of flux, the thumb indicates the direction of motion of coil, then middle finger indicates the direction of induced *e.m.f.*	3
	c)	Explain with a neat diagram, working of mutually induced *e.m.f.* 5 *Ans.* <u>Mutually Induced *e.m.f.*</u>  Mutually induced e.m.f The *e.m.f.* induced in a coil, due to the changing flux created by the current flowing through the neighbouring coil, is called mutually induced *e.m.f.* It is denoted by C_m and measured in volts.	5
10.	a)	List the types of electric iron. 2 *Ans.* <u>Types of Iron</u> — Non-automatic electric iron — Automatic electric iron.	2

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	b)	Define the term 'Reverse bias'. 3 *Ans.* Reverse bias When an external voltage is applied such that the positive terminal of the battery is connected to N-type semiconductor and the negative terminal to P-type semiconductor then it is said to be reverse bias.	3
	c)	Draw a neat diagram of an electric bell and label the parts. *Ans.* Electric Bell  A. Armature B. Hammer or clapper C. Gong D. Soft iron core E. Bakelite base F. Coil. T_1,T_2 Terminals Sketch - 4 Parts - 1	5
		OR	
	a)	Mention the types of extrinsic semiconductor. 2 *Ans.* i) P-type semiconductor ii) N-type semiconductor	2
	b)	Explain the function of thermostat. 3 *Ans.* Thermostat is a automatic temperature control switch. It is made of two different materials *i.e.* it consists of two strips. Thermostat is used in automatic electric iron, bread toaster, fridge etc.	3

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Draw the neat symbols of PNP and NPN transistors and explain any one. 5 *Ans.*  <u>PNP Transistor</u> When N-type semiconductor is sandwiched in between two layers to P-type semiconductor, then PNP transistor is formed. <u>NPN Transistor</u> When P-type semiconductor is sandwiched in between two layers of N-type semiconductor, then NPN transistor is formed.	5