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

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

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S. S. L. C. EXAMINATION, JUNE, 2017

ಮಾದರಿ ಉತ್ತರಗಳು

MODEL ANSWERS

ದಿನಾಂಕ : 17. 06. 2017] ಸಂಕೇತ ಸಂಖ್ಯೆ : **71**

Date : 17. 06. 2017] **CODE NO. : 71**

ವಿಷಯ : ಎಲಿಮೆಂಟ್ಸ್ ಆಫ್ ಇಂಜಿನಿಯರಿಂಗ್

Subject : ELEMENTS OF ENGINEERING

(ಹೊಸ ಪಠ್ಯಕ್ರಮ / New Syllabus)

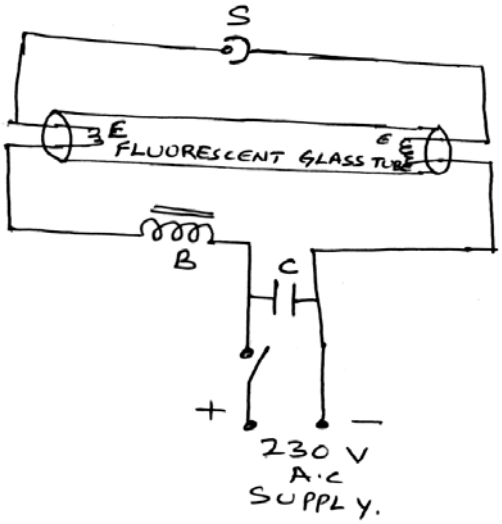
(ಪುನರಾವರ್ತಿತ ಶಾಲಾ ಅಭ್ಯರ್ಥಿ/ Regular Repeater)

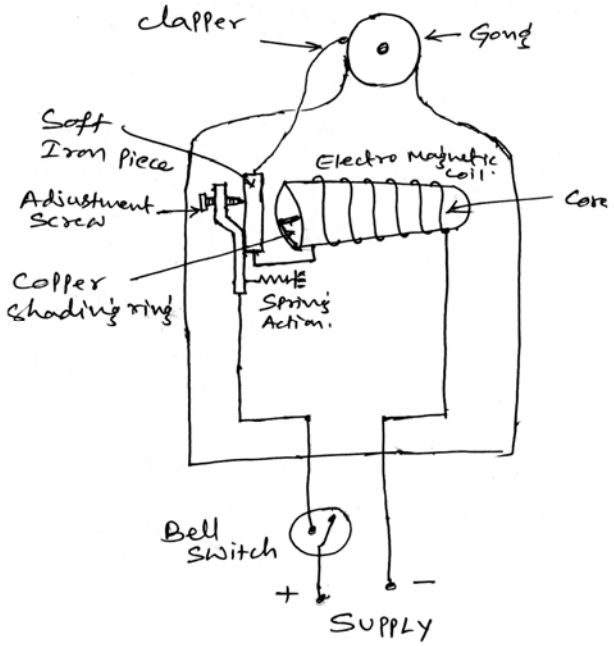
[ಗರಿಷ್ಠ ಅಂಕಗಳು : **50**

[Max. Marks : 50

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
		SECTION - A	
1.	a)	amplitude	
	b)	metal conduit system	
	c)	current coil & pressure coil	
	d)	series motor	
	e)	mutual induction	
	f)	carburettor	
	g)	overheating	
	h)	cast iron	
	i)	centrifugal pump	
	j)	grate	10 × 1 = 10

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
2.	a)	I Law : When a conductor cuts the magnetic flux, an *emf* is induced. II Law : The magnitude of the induced *emf* is equal to the rate of change of flux linkages.	2
	b)	Types of self excited *d.c.* generators : i) Series generator ii) Shunt generator iii) Compound generator	3
	c)	D.C. motor is an electrical machine which converts electrical energy into mechanical energy. Applications : i) Electric trains ii) Trolley cars iii) Wood turning machines iv) Lathe machines v) Machine tool driving vi) Punch presses vii) Elevators viii) Hoist conveyors ix) Rope drivers x) Rolling mills.	2 + 3
3.	a)	No. of cycles per second of an *a.c.* quantity is called frequency. The unit of frequency is hertz (Hz) $f = \frac{PN}{120}$.	2
	b)	Advantages of the squirrel-cage induction motor : i) Starting of motor is very simple ii) It is robust in construction iii) Cost is low iv) Maintenance is easy v) It has high starting torque vi) No question of wear & tear.	3

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
	c)	Fluorescent lamp :  *B* — Ballast or choke *C* — Capacitor *E* — Electrodes *S* — Starter. FTL consists of a long glass tube internally coated with fluorescent powder. It operates with extra devices like glow starter & choke. The FTL connection is shown in the circuit diagram. When the supply is given to the lamp, the full voltage is received by starter and heats the electrodes sufficiently. The starter opens the circuit. A 1000 volt induces in choke & lasting 1 or 2 seconds. This surge voltage is enough to heat the electrodes to incandescence and voltage falls to 100 to 110 V. Tubelight has small amount of mercury along with argon gas. The temperature of heat vaporizes the mercury & finally current discharges in mercury vapour and emits ultraviolet radiations and this acts to the fluorescent powder and emits visible light like day colour.	

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
			3 + 2
4.	a)	Sources required for power generation. Hydroelectric power — River water Thermal power — Solid coal.	2
	b)	Electric bell :  	4
	c)	Short notes : i) Back *emf* : The *emf* induced in a conductor to act in opposition to the applied voltage is called back *emf*. $E_b = V - I_a R_a$. ii) Transformer : It is a static device, which transfers electrical power (energy) from one circuit to another circuit without changing their frequency and power. It has primary & secondary windings. There are 3 types of transformer : i) Step-up transformer ii) Step-down transformer	

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
		iii) Berry type transformer iii) Indoor wiring : Indoor wiring brings the various electrical points, which are laid according to I.S. rules. There are 5 types of indoor wiring systems : i) Cleat wiring ii) CTS wiring iii) Casting & capping wiring iv) Conduit wiring v) Metal sheathed wiring.	2 + 2
		SECTION - B	
5.	a)	Boiler is a closed metallic vessel in which water is heated by the application of heat and converted into stream.	2
	b)	Pressure gauge is used to indicate the pressure of the steam inside the boiler. It is one of the important boiler mounting.	2
	c)	Sketch of locomotive boiler. Locomotive boiler is generally used in locomotives. It is also used for stationary purposes. It consists of steam barrel, combustion chamber, smoke box, flue tubes, grate ash pan, chimney. The steam can be generated up to a pressure of 25 kg/t (mg) Sketch Description	4 2 6
6.	a)	Heat engine is a mechanical device in which heat	

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
		energy is converted into mechanical energy.	2
	b)	In two-stroke engine the power is developed in every two strokes of the piston or one revolution of the crankshaft. In four-stroke engine the power is developed in every four strokes of the piston or two revolutions of crankshaft.	1 1
	c)	Sketch of a simple carburettor. Carburettor is used in petrol engine. The main function of the carburettor is to mix the petrol and air in proportion. It consists of a float and needle. From the carburettor the mixture of petrol and air is supplied to the engine cylinder. Sketch Description	 4 2 6
7.	a)	Turbines are classified as i) Water turbine ii) Gas turbine and further divided according to working principle i) Impulse turbine ii) Reaction turbine.	 2 × 1
	b)	The centrifugal pump can run at higher speed. Delivery is continuous, priming is necessary, can handle dirty	

Qn. Nos.	Sub. Qn.No.	Value Points	Marks
		water. Wear and tear is less, maintenance cost is less.	$4 \times \frac{1}{2}$
	c)	Sketches of Pelton wheel. Pelton wheel is an example of impulse turbine. It consists of blades or buckets in the shape of hemispherical cup shape. The water from one or more nozzle hit the cups at the centre due to the impulse of water wheel rotates. It is one of the important prime movers used in hydroelectric generation station to drive electric generator. Sketch Description	 4 2 6