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Question Bank for the Units – I to V

SEM-4	**4th Semester – B.E. / B.Tech.**			
BR-114	**Department of Mechanical Engineering**			
ME8493	**THERMAL ENGINEERING-I**			
	Part-A (10 x 2 = 20 Marks)			
	UNIT – I(GAS AND STEAM POWER CYCLES)			
No	**Question**	**Level**	**Competence**	**Mark**
1.1	What are assumptions made in air standard cycles?	L1	Remembering	2
1.2	Draw the Brayton cycle on P-V and T-S diagrams.	L1	Remembering	2
1.3	Define mean effective pressure. What is its importance in reciprocating engines?	L1	Remembering	2
1.4	Draw the Diesel cycle. Show that on a P-V and T-S diagrams.	L4	Remembering	2
1.5	Write any four major differences between Otto cycle and Diesel cycle.	L1	Remembering	2
1.6	Mention the four thermodynamic processes involved in Diesel Cycle.	L1	Remembering	2
2.1	What is compression ratio?	L1	Remembering	2
2.2	Define the terms actual thermal efficiency and relative efficiency.	L1	Remembering	2
2.3	Define specific heat rate	L1	Remembering	2
2.4	Sketch the Rankine cycle on a P-V plane and name the various processes.	L1	Remembering	2
2.5	Mention the possible ways to increase thermal efficiency of Rankine cycle.	L1	Remembering	2
	UNIT-II(RECIPROCATING AIR COMPRESSOR)			
3.1	Define the terms: Free-air delivery and volumetric efficiency compression?	L2	Understanding	2
3.2	Define isentropic efficiency.	L1	Remembering	2
3.3	What do you mean by perfect intercooling?	L2	Understanding	2
3.4	List out the factors limit the delivery pressure in a reciprocating compressor.	L4	Analyzing	2
3.5	Define volumetric efficiency of an air compressor.	L1	Remembering	2

3.6	State the conditions which lower the volumetric efficiency of an air compressor.	L1	Remembering	2
4.1	Why clearance is necessary in reciprocating compressors	L2	Understanding	2
4.2	Write the difference between centrifugal and axial compressors.	L4	Analyzing	2
4.3	What are the merits of multistage compression?	L1	Remembering	2
4.4	Define the term isothermal compression efficiency.	L1	Remembering	2
4.5	What are a slip factor and a pressure coefficient?	L1	Remembering	2
	UNIT – III ((INTERNAL COMBUSTION ENGINES AND COMBUSTION)			
5.1	What are the functions of a flywheel?	L1	Remembering	2
5.2	State the functions of connecting rod, piston and crank shaft?	L1	Remembering	2
5.3	What are the main components of IC engines?	L1	Remembering	2
5.4	List out the factors affecting the ignition lag?	L1	Remembering	2
5.5	Define the phenomenon 'knocking' in spark ignited engines.	L1	Remembering	2
6.1	Draw the port timing diagram of a petrol engine?	L1	Remembering	2
6.2	Draw the actual PV diagram of the four stroke petrol engine and indicate the salient points and ignition position?	L1	Remembering	2
6.3	Draw the actual PV diagram of the four stroke diesel engine and indicate all the process?	L1	Remembering	2
6.4	Draw the valve timing diagram for a CI engine?	L1	Remembering	2
6.5	Show the valve over lapping period of a typical 4-stroke petrol engine on valve timing diagram?	L1	Remembering	2
	UNIT-IV (INTERNAL COMBUSTION ENGINE PERFORMANCE AND SYSTEMS)			
7.1	Define the term brake power.	L2	Understanding	2
7.2	What are the advantages of MPFI system?	L1	Remembering	2
7.3	What is gasoline injection system?	L2	Understanding	2
7.4	Define continuous injection of petrol engine.	L1	Remembering	2
7.5	What are the types of electronic injection system used in SI engine	L1	Remembering	2
8.1	What is super charging?	L2	Understanding	2
8.2	How does a turbocharger work?	L1	Remembering	2
8.3	Define intermittent injection of petrol engine.	L2	Understanding	2
8.4	State the diesel vehicle emission norms of EURO BS-IV ing/km.	L4	Analyzing	2

8.5	Difference between Bharat stage-III and Bharat stage-IV emission norms?	L1	Remembering	2
8.6	Are EURO and Bharat norms the same? If not then the difference between them?	L4	Analyzing	2
	UNIT-V (GAS TURBINES)			
9.1	Why is power generation by gas turbines attractive these days?	L1	Remembering	2
9.2	What are the main units in a gas turbine power plant?	L1	Remembering	2
9.3	List out various factors which influence the performance of gas turbine?	L1	Remembering	2
9.4	What is intercooling and why it is done?	L1	Remembering	2
10.1	What is reheating and regeneration of gas turbine?	L1	Remembering	2
10.2	How the gas turbine blades are cooled?	L1	Remembering	2
10.3	What are the applications of gas turbine power plant?	L1	Remembering	2
10.4	How does regeneration improve the thermal efficiency of gas turbine cycle?	L1	Remembering	2
	Part – B (5 x 16 = 80 Marks) or Part – B (5 x 13 = 65 Marks)			
	UNIT – I(GAS AND STEAM POWER CYCLES)			
11.a-1	Derive an expression for Air standard efficiency and state the assumptions of an Otto Cycle.	L2	Understanding	(13)
11-a-2	A spark ignition engine working on ideal Otto cycle has the compression ratio 6. The initial pressure and temperature of air are 1 bar and 37C. The maximum pressure in the cycle is 30 bar. For unit mass flow, calculate (i) p, v and T at various salient points of the cycle and (ii) the ratio of heat supplied to the heat rejected. Assume γ=1.4 and R= 8.314 KJ/KmolK.	L3	Applying	(13)
11.a-3	Derive an expression for the air standard efficiency of Diesel cycle & then deduce mean effective pressure.	L2	Understanding	(13)
11-a-4	An engine with 200 mm cylinder diameter and 300 mm stroke works on theoretical Diesel cycle. The initial pressure and temperature of air used are 1 bar and 27 ^{0}C.The cut-off is 8% of the stroke. Determine the: (i) Pressures and temperatures at all salient points (ii) Theoretical air standard efficiency (iii) Mean effective pressure (iv) Power of the engine if the working cycles per minute are 380. Assume that the compression ratio is 15 and working fluid is air.	L3	Applying	(13)
11-a-5	The swept volume of a diesel engine working on dual cycle is 0.0053 m^3 and clearance volume is 0.00035 m^3. Fuel injection ends at 5 percent of the stroke. The temperature and pressure at the start of the compression are 80^{0}C and 0.9bar.Determine the air standard efficiency of the cycle. Take γ for air as 1.4.	L3	Applying	(13)
11.b-1	An air standard dual cycle has a compression ratio of 10.The pressure and temperature at the beginning of compression is 1 bar and 27^{0}C. The maximum pressure reached is 42 bar and the maximum temperature is	L3	Applying	(13)

	1500^{0}C.Determine (i) The temperature at the end of constant volume heat addition, (ii) cut-off ratio,(iii)work done per kg of air, and(iv) the cycle efficiency. Assume C_P =1.004 KJ/kgK and C_V =0.717Kj/kgK for air.			
11.b-2	In a gas turbine plant working on the Brayton cycle the air at the inlet is at 27^{0}C, 0.1Mpa. The pressure ratio is 6.25 and the maximum temperature is 800^{0}C.The turbine and compressor efficiencies are each 80%.Find the (i) Compressor work per kg of air (ii) Turbine work per kg of air (iii) Heat supplied work per kg of air (iv) Cycle efficiency, and (v) Turbine exhaust temperature.	L3	Applying	(13)
11.b-3	With the help of T-S diagram explain the various process of ideal rankine cycle and derive the efficiency equation.	L2	Understanding	(13)
11.b-4	In a Rankine cycle, the steam at inlet to turbine is saturated at a pressure of 35 bar and the exhaust pressure is 0.25 bar the flow rate of steam is 9.5 kg/sec Determine the pump work, Turbine work, Rankine efficiency, condenser heat flow, work ratio, Specific steam consumption.	L3	Applying	(13)
11.b-5	A reheat Rankine cycle receives steam at 35 bar and 0.1 bar. Steam enters the first stage steam turbine 350^{0}C. Calculate specific steam consumption and reheat Rankine cycle efficiency.	L3	Applying	(13)
	UNIT-II(RECIPROCATING AIR COMPRESSOR)			
12-a-1	With a neat sketch, describe the construction and working of a single-stage acting reciprocating air compressor. Also derive the equation for work done with clearance and without clearance.	L2	Understanding	(13)
12-a-2	Derive an expression for equation of work in terms of clearance factor in a single stage compressor with n as the index of expansion and compression	L2	Understanding	(13)
12-a-3	Prove that the workdone/kg of air in a compressor is given by W = $RT_1(n/n-1)\ [(r_p)^{n-1}/n - 1]$ where r_p = pressure ratio.	L2	Understanding	(13)
12-a-4	Drive an expression for volumetric efficiency of reciprocating air compressor.	L2	Understanding	(13)
12-a-5	Explain the construction and working principle of multi-stage compressor and discuss the perfect and imperfect inter cooling with a neat sketch.	L2	Understanding	(13)
12-a-6	A single stage single acting compressor delivers 15 m^3 of free air per minute from 1 bar to 8 bar. The speed of compressor is 300 rpm. Assuming that compression and expansion follow the law $pv^{1.3}$=constant and clearance is 1/16th of swept volume, find the diameter and the stroke of the compressor. Take L/D=1.5. The temperature and pressure of air at the suction are 20C and 1 bar respectively.	L3	Applying	(13)
12-a-7	A single acting air compressor takes in atmospheric air (atm condition 101.325 KPa, 27C) and delivers it at 1.4 MPa. The compressor runs at 300 rpm and has cylinder diameter of 160 mm and stroke of 200 mm, clearance volume 4% of stroke volume. If the pressure and temperature of air at the end of suction stroke are 100 KPa and 47C and law of compression and expansion is $PV^{1.2}$=constant, determine, (i) Mass of air delivered per minute, (ii) Volumetric efficiency, (iii) Driving power required if η_{mech}=0.85.	L3	Applying	(13)

12-b-1	A single acting, single cylinder reciprocating air compressor has a cylinder diameter of 200 mm and a stroke of 300 mm. Air enters the cylinder at 1 bar, 27C. It is then compressed polytropically to 8 bar according to the law PV1.3=constant. If the speed of the compressor is 250 rpm, calculate the mass of air compressed per minute, and the power required in KW for driving the compressor.	L3	Applying	(13)
12-b-2	A single stage single acting air compressor is used to compress air from 1.013 bar and 25° C to 7 bar according to law $PV^{1.3}$ = C. The bore and stroke of a cylinder are 120mm and 150mm respectively. The compressor runs at 250 rpm .If clearance volume of the cylinder is 5% of stroke volume and the mechanical efficiency of the compressor is 85%, determine volumetric efficiency, power, and mass of air delivered per minute.	L3	Applying	(13)
12-b-3	A two stage singe acting air compressor compresses $2m^3$ airs from 1 bar and 20° C to 15 bar. The air from the low pressure compressor is cooled to 25° C in the intercooler. Calculate the minimum power required to run the compressor if the compression follows $PV^{1.25}$=C and the compressor runs at 400 rpm.	L3	Applying	(13)
12-b-4	In a single acting two stage reciprocating air compressor compresses 4.5 kg of air per min from 1.0133 bar and 15^0C through a pressure ratio of 9 to 1. Both stages have the same pressure ratio, and the law of compression and expansion in both stages is $PV^{1.3}$. Calculate: (i) The indicated power, (ii) cylinder swept volume required. Assume that the clearance volume of both stages are 5% of their respective swept volumes and that the compressor runs at 300 rpm.	L3	Applying	(13)
12-b-5	A single acting two stage compressor with complete inter cooling delivers 6 kg/min of air at 16 bar (1.6Mpa). Assuming an intake at 1 bar (100Kpa) and 15^0C and compression and expansion with the law $pv^{1.3}$= C. Calculate (i) Power required to run the compressor (ii) Isothermal efficiency (iii) Free air delivered per sec. (iv) If clearance ratios of LP and HP cylinder are 0.04 and 0.06,calculate volumetric efficiency and swept volume for each cylinder. Assume R=0.287kJ/kgK, C_V=0.71kJ/kgK.	L3	Applying	(13)
12-b-6	A two-stage air compressor consists of three cylinders having the same bore and stroke. The delivery pressure is 7 bar and the free air delivery is 4.3 m^3/min. Air is drawn in at 1.013 bar, 15^0C and an intercooler cools the air to 38^0C. The index of compression is 1.3 for all the three cylinders. Neglecting clearance calculate: (i) The intermediate pressure (ii) The power required to drive the compressor (iii) The isothermal efficiency.	L3	Applying	(13)
12-b-7	A three stage air compressor with perfect intercooling takes 15 m^3 of air per minute at 95 KPa and 27C, and delivers the air at 3.5 MPa. If the compression process is polytropic ($PV^{1.3}$=C), determine (i) Power required if mechanical efficiency is 90%, (ii) Heat rejected in the intercoolers per minute, (iii) Isothermal efficiency, (iv) Heat rejected through cylinder walls per minute.	L3	Applying	(13)
	UNIT – III ((INTERNAL COMBUSTION ENGINES AND COMBUSTION)			
13.a-1	Compare SI engine and CI engine with respect to (i) Basic cycle, (ii) Fuel used, (iii) Introduction of fuel, (iv) Ignition, (v) Compression ratio, (vi) Speed, (vii) Efficiency, (viii) weight.	L2	Understanding	(13)
13.a-2	Explain the working principle of four stroke engine.	L2	Understanding	(13)

13.a-3	Explain the main difference between a petrol and Diesel internal combustion engine.	L2	Understanding	(13)
13.a-4	Explain the main difference between a two stroke and four stroke cycle internal combustion engine.	L2	Understanding	(13)
13.b-1	(i)Draw & explain Port timing diagram of two stroke Petrol & Valve timing diagram of Four stroke Petrol engine. (ii)Discuss the difference between theoretical and actual valve timing diagrams of a diesel engine.	L2	Understanding	(13)
13.b-2	With a neat sketch , the phenomena of knocking in SI engine.	L2	Understanding	(13)
13.b-3	Compare the various stages of combustion in SI engine with p-0 diagram	L2	Understanding	(13)
13.b-4	Compare the various stages of combustion in CI engine with p-0 diagram	L2	Understanding	(13)
	UNIT-IV (INTERNAL COMBUSTION ENGINE PERFORMANCE AND SYSTEMS)			
14.a-1	Explain the following with sketches. Splash Lubrication of IC Engines, Thermosyphon cooling of IC Engines.	L2	Understanding	(13)
14.a-2	Explain the operation of MPFI with neat sketch	L2	Understanding	(13)
14.a-3	Explain the common rail direct injection system.	L2	Understanding	(13)
14.a-4	Mention the various important qualities of good ignition system and with a neat sketch explain the battery and magneto ignition system.	L2	Understanding	(13)
14.a-5	Explain with the help of sketches ignition system for a spark ignition engine.	L2	Understanding	(13)
14.a-6	Write short notes on cooling system for IC engine in detail with relevant sketches of various types.	L2	Understanding	(13)
14.a-7	Write short notes on lubrication system for IC engine in detail with relevant sketches of various types.	L1	Remembering	(13)
14.b-1	(i) Explain the pressure lubrication system with a neat sketch. (ii)Explain the bosch fuel injector with a neat sketch.	L2	Understanding	(13)
14.b-2	Air consumption for a four stroke petrol engine is measured by means of a circular orifice of diameter 3.5 cm. The coefficient of discharge for the orifice is 0.6 and the pressure across the orifice is 14 cm of water. The barometer reads 760 mm of Hg. The temperature of air in the room is 24C. The piston displacement volume is 1800 cm^3. The compression ratio is 6.5. The fuel consumption is 0.13 Kg/min and calorific value is 44,000 KJ/Kg. The brake power developed at 2500 rpm is 28 KW. Determine (i) Air fuel ratio, (ii) Volumetric efficiency on the basis of sir alone, (iii) Brake mean effective pressure, (iv) Relative efficiency on brake thermal efficiency basis.	L3	Applying	(13)
14.b-3	Following date are available for a four stroke petrol engine: Air fuel ratio by weight = 16:1, CV of fuel = 45200 KJ/Kg, Mechanical efficiency = 82%, Air standard efficiency = 52%, Relative efficiency = 70%, Volumetric efficiency = 78%, Stroke/Bore ratio = 1.25, suction conditions=1 bar,25^0C, Speed = 2400 rpm, Power at brakes = 72 KW. Calculate (i) Compression ratio, (ii) Indicated thermal efficiency, (iii)	L3	Applying	(13)

	Brake specific fuel consumption. Following date are available for a four stroke petrol engine: Air fuel ratio by weight = 15.5:1, CV of fuel = 45000 KJ/Kg, Mechanical efficiency = 80%, Air standard efficiency = 53%, Relative efficiency based on indicated thermal efficiency = 70%, Volumetric efficiency = 80%, Stroke/Bore ratio = 1.25, Speed = 2400 rpm, Power at brakes = 74 KW. Calculate (i) Compression ratio, (ii) Indicated thermal efficiency, (iii) Brake specific fuel consumption, (iv) Bore and stroke.	L3	Applying	(13)
14.b-4	In a constant speed compression ignition engine operating on four stroke cycle and fitted with band brake, the following observations were taken: Brake wheel diameter = 60 cm, Band thickness = 5 mm, Speed = 450 rpm, Load on band = 210 N, Spring balance reading = 30 N, Area of indicator diagram = 4.15 cm^2, Length of indicator diagram = 6.25 cm, Spring No.11, i.e. 11 bar/cm, Bore = 10 cm, Stroke = 15 cm, Specific fuel consumption = 0.3 Kg/KW-hr, Heating value of fuel = 41800 KJ/Kg. Determine the brake power, indicated power, mechanical efficiency, indicated thermal efficiency and brake thermal efficiency.	L3	Applying	(13)
14.b-5	A four cylinder, four stroke oil engine 10cm in diameter and 15cm in stroke develops a torque of 185 Nm at 2000 rpm. The oil consumption is 14.5 lit/hr. The specific gravity of the oil is 0.82 and calorific value of oil 42,000kJ/kg. If the IMEP taken from the indicated diagram is 6.7 bar, find (i) Mechanical efficiency, (ii) Brake thermal efficiency, (iii) Brake mean effective pressure, (iv) Specific fuel consumption in litres on brake power basis.	L3	Applying	(13)
14.b-6	An eight-cylinder, 4 stroke engine of 0.09 m bore and 0.08 m stroke with a compression ratio of 7 is tested at 4500 rpm on a dynamometer which has 0.54 m arm. During a 10 min test the dynamometer scale beam reading was 42 kgf and the engine consumed 4.4 kg of gasoline having a calorific value of 44,000 kJ/kg. Air 300 K and 1 bar was supplied to the carburetor at the rate of 6 kg/min. Find the brake power delivered, brake mean effective pressure, brake specific fuel consumption, brake specific air consumption, brake thermal efficiency, volumetric efficiency and the air fuel ratio.	L3	Applying	(13)
14.b-7	Calculate the diameter and length of the stroke constant pressure cycle from the following data. Indicated power=18.75 KW, rotation per minute=220, Compression ratio=14, Fuel cut-off=1/20th of the stroke, Index of expansion=1.3, Index of compression=1.35, Length/Diameter=1.5, Assume the pressure and temperature of the air at the inlet are 1 bar and 40C respectively.	L3	Applying	(13)
	UNIT-V (GAS TURBINES)			
15.a-1	List the types of Gas turbine power plants and explain in detail with a neat diagram.	L2	Understanding	(13)
15.a-2	Bring out the difference between closed cycle and open cycle Gas turbine power plant.	L4	Analyzing	(8)
15.a-3	With a brief note on starting system of Gas turbine.	L3	Applying	(13)

15.a-4	Compare the merits and demerits of closed cycle and open cycle Gas turbine.	L3	Applying	(13)
15.b-1	Obtain optimum pressure ratio condition for minimum compressor work requirement in two stage perfect intercooled compression.	L3	Applying	(13)
15.b-2	A gas turbine plant of 800KW capacity takes the air at 1.01 bar and 15^0C. The pressure ratio of the cycle is 6 and maximum temperature is limited to 700^0C. A regenerator of 75% effectiveness is added in the plant to increase the overall efficiency of the plant. The pressure drop in the combustion chamber is 0.15 bar. Assuming the isentropic efficiency of the compressor as 80% and of the turbine as 85%, Determine the plant thermal efficiency neglect the mass of the fuel.	L3	Applying	(13)
15.b-3	In an air standard Brayton cycle, the air enters the compressor at 1 bar and 15^0C. The pressure leaving the compressor is 5 bar and the minimum temperature in the cycle is 900^0C. Find the following. a)compressor and expander work per kg of air b)cycle efficiency c)If an ideal regenerator is incorporated in to the cycle, determine the percentage change in efficiency.	L3	Applying	(13)
15.b-4	A gas turbine draws in air from atmosphere at 1 bar and 25^0C and compresses it to 5 bar. The air is heated to 1250K at constant pressure and then expanded through two stages in series back to 1 bar. The high pressure turbine is connected to the compressor and produces just enough power drive it. The low pressure stage is connected to an external load and produces 82KW of power. Calculate the mass flow of air, the inter stage pressure of the turbines and the thermal efficiency of the cycle. Assume γ=1.4 and C_p =1.005KJ/KgK for both the turbines and the compressor. Neglect the increase in mass due to the addition of fuel for burning.	L3	Applying	(13)
	Part – C (1 x 15 = 15 Marks)			
	UNIT – I(GAS AND STEAM POWER CYCLES)			
16 .a-1	With suitable sketches, explain the differences between the actual and theoretical p-v diagrams of a four stroke Otto cycle engine.	L4	Analyzing	(15)
16 .a-2	With suitable sketches, explain the differences between the actual and theoretical p-v diagrams of a two stroke Otto cycle engine.	L4	Analyzing	(15)
	(OR)			
16.b-1	Derive an expression for the air-standard efficiency of diesel cycle. Explain why the efficiency of Otto cycle is greater than that of the diesel cycle for the same compression ratio.	L4	Analyzing	(15)
16.b-2	Is reheat cycle is more efficient than regenerative cycle? Justify	L4	Analyzing	(15)
	UNIT-II(RECIPROCATING AIR COMPRESSOR)			
16 .a-1	Derive the expression for volumetric efficiency of air compressor.	L4	Analyzing	(15)
16 .a-2	Derive an expression for minimum work required in two stage compressor:	L4	Analyzing	(15)

	(OR)			
16.b-1	Explain the working principle of intercooler with neat sketch and explain the working principle of axial flow compressor.	L4	Analyzing	(15)
16.b-2	What is the necessity for multistage compression? Derive an expression for optimum intermediate pressure of a multi-stage compressor with perfect intercooling. Represent the process on p-v plane. Also list the merits and demerits of multistage compression process.	L4	Analyzing	(15)
	UNIT – III ((INTERNAL COMBUSTION ENGINES AND COMBUSTION)			
16 .a-1	Analyse the effect of Octane and Cetane number on the IC engine cycle and performance.	L4	Analyzing	(15)
	(OR)			
16.b-1	Explain the phenomena of knocking in diesel engines. What are the different factors which influence the knocking?	L4	Analyzing	(15)
	UNIT-IV (INTERNAL COMBUSTION ENGINE PERFORMANCE AND SYSTEMS)			
16 .a-1	Derive the equation for mean effective pressure.	L4	Analyzing	(15)
	(OR)			
16.b-1	Discuss Euro norms in detail.	L4	Analyzing	(15)
	UNIT-V (GAS TURBINES)			
16 .a-1	Compare reheat and regenerative cycles for gas turbines	L4	Analyzing	(15)
	(OR)			
16.b-1	Discuss the parameter of performance for gas turbines.	L4	Analyzing	(15)

L1: Knowledge, L2: Comprehension, L3: Application, L4: Analysis, L5: Evaluation, L6: Synthesis

QUESTION BANK SUMMARY

S.NO	UNIT	DETAILS	L1	L2	L3	L4	L5	L6	TOTAL
1	Unit-1	PART-A	10	0	0	1	0	0	11
		PART-B	0	3	7	0	0	0	10
		PART-C	0	0	0	4	0	0	4
2	Unit-2	PART-A	6	3	0	2	0	0	11
		PART-B	0	5	9	0	0	0	14
		PART-C	0	0	0	4	0	0	4
3	Unit-3	PART-A	10	0	0	0	0	0	10
		PART-B	0	8	0	0	0	0	8
		PART-C	0	0	0	2	0	0	2
4	Unit-4	PART-A	5	4	0	2	0	0	11
		PART-B	1	7	6	0	0	0	14
		PART-C	0	0	0	2	0	0	2
5	Unit-5	PART-A	8	0	0	0	0	0	8
		PART-B	0	1	6	1	0	0	8
		PART-C	0	0	0	2	0	0	2

Total No of Questions	PART-A	PART-B	PART-C	TOTAL
	52	55	12	119

Prepared By:
Staff Name1: Mr.R.Radhakrishnan