Code No: R21242 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, September - 2014
AUTOMOTIVE ENGINES
(Automobile Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) What are the different types of automotive power plants? Explain anyone of them with the neat sketch?
   b) Discuss relative merits and demerits of internal combustion and external combustion engines? (8M+7M)

2. a) Explain the working principle of Wankel rotary engine?
   b) Discuss the lubrication system of typical Wankel RC engine giving a schematic layout? (8M+7M)

3. a) Explain in brief the constructional and manufacturing processes of piston?
   b) Explain the constructional method and functions of piston rings? (8M+7M)

4. a) What are the mixture requirements for (a) starting and warm up (b) acceleration?
   b) What is the function of a carburetor in an SI engine? Briefly explain with a neat sketch the operation of a simple float type carburetor? (8M+7M)

5. a) What is petrol injection? What are its advantages and disadvantages?
   b) Explain about the gasoline direct injection system in brief? (7M+8M)

6. a) Explain about the distributor system with a neat sketch in detailed?
   b) Determine the quantity of fuel to be injected per cycle per cylinder for a 6 cylinder 4-stroke perkins diesel engine having brake specific fuel consumption of 245 gm per KW-hr and developing 89KW at 2500 rpm. Take specific gravity of fuel as 0.84? (8M+7M)

7. a) What are the characteristics to be possessed by the injection nozzles?
   b) Explain about the porter governor with the help of neat sketch? (7M+8M)

8. a) Explain about the pressurized water cooling with the help of figure?
   b) What are the advantages and disadvantages of water cooled engines over air cooled engines (8M+7M)
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Code No: R21242 **R10** SET - 2

II B. Tech I Semester Supplementary Examinations, September - 2014
AUTOMOTIVE ENGINES
(Automobile Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
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1. a) What are the two basic types of internal combustion engines? List out the fundamental differences between them?
   b) What are the principal applications of IC engines? Explain them in brief. (8M+7M)

2. a) Explain the working principle of variable compression ratio engines?
   b) Sketch the hypothetical and actual diagrams of valve timing diagram for the four stroke diesel engine? (7M+8M)

3. a) Explain the functions of crankcase in IC engine and also about crankcase ventilation?
   b) Explain the manufacturing procedure involved in the production of the connecting rod? (7M+8M)

4. The 4-stroke petrol engine of Hindustan Ambassador has capacity of 1489 C.C. It develops maximum power at 4200 rev/min. The volumetric efficiency at this speed is 70% and the air/fuel ratio is 13:1. At peak power the theoretical air speed at choke is 90 m/s. The coefficient of discharge for the venturi is 0.85 and that of the main petrol jet is 0.66. An allowance should be made for the emulsion tube, the diameter of which can be taken as 1/2.5 of the choke diameter. The petrol surface is 6mm below the choke at this engine condition. Calculate the sizes of a suitable choke and main jet. The specific gravity of petrol is 0.74. Atmospheric pressure and temperature are 1.013 bar and 20^0 C respectively? (15M)

5. a) What are the different methods of petrol injection? Explain them in brief?
   b) Explain how the emission reductions to be done by the control of A/F ratio in SI engine? (8M+7M)

6. a) Explain the delivery characteristics of fuel pumps?
   b) Discuss the rotary distributor pumps with the help of neat sketches? (8M+7M)

7. a) Demonstrate the watt governor with the help of neat sketch?
   b) Describe the Pintle and Pintaux nozzles with the aid of neat sketches? (8M+7M)

8. a) Discuss Dry sump lubrication system with the help of suitable sketch?
   b) What are the advantages and disadvantages of air cooling engines over the water cooling engines? (8M+7M)
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Code No: R21242 **R10** SET - 3

II B. Tech I Semester Supplementary Examinations, September - 2014
AUTOMOTIVE ENGINES
(Automobile Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
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1. a) Describe the basic type of cylinder arrangements in IC engines with the neat sketches and also list out their applications?
   b) Classify the IC engines in detailed and explain the importance of the IC engines? (8M+7M)

2. a) Explain the processes involved in the stirling engine with the help of P-V diagram and obtain the expression of thermal efficiency of the cycle?
   b) List out the merits and demerits of two stroke engines over the four stroke engines? (8M+7M)

3. a) Explain the constructional details involved and manufacturing method involved for designing of the crankshaft?
   b) What are the functions of cam shaft? Explain in detailed? (8M+7M)

4. a) Describe the SU carburetor with the neat sketch?
   b) A 10 cmx12cm four cylinder, 4 stroke engine running at 2000 revolutions per minute has a 8M carburetor venturi with a 3cm throat. Determine the suction at the throat assuming the volumetric efficiency of the engine to be 70%.Assume density of air to be 1.2 Kg/m^3 and coefficient of air flow 0.8? (8M+7M)

5. a) Discuss the cylinder port and manifold injections in SI engines.
   b) Why the multipoint injection system explain with the help of neat sketch. (8M+7M)

6. a) Explain the common rail system with a neat sketch in brief?
   b) Determine the diameter of a fuel orifice for a 4-stroke engine developing 15 KW per cylinder at 2000 rev/min, using 0.272 kg/KW-hr fuel of 32^0 API. The duration of injection is 30^0 of crank travel. The fuel injection pressure is 120 bar and the combustion chamber pressure is 30 bar. Take velocity coefficient 0.9 and $\rho = \frac{141.5}{131.5 + API}$? (6M+9M)

7. a) Sketch and explain the unit injectors in detailed?
   b) What is a governor? Explain about any of the pneumatic governor with the help of neat sketch (8M+7M)

8. a) Explain about the different types of oil filters with the help of figures
   b) Draw the neat sketch of crankcase ventilation make a note of salient features? (8M+7M)
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Code No: R21242 **R10** SET - 4

II B. Tech I Semester Supplementary Examinations, September - 2014
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(Automobile Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
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1. a) What are the advantages and disadvantages of supercharging of IC engines?
   b) Explain the importance of turbo charging in the engines and also explain the process in detailed? (8M+7M)

2. a) Explain the different types of scavenging systems for two stroke petrol engines?
   b) Draw the actual port timing diagram for the two stroke petrol engine and explain the importance of port timing diagram? (7M+8M)

3. a) What are the different types of bearings used in IC engines and explain the function of any of the bearing with a neat sketch?
   b) Explain the operation of inlet and exhaust manifolds with the help of neat sketches? (7M+8M)

4. What additional systems are necessary in a complete carburetor? Explain each of them in detailed with the neat sketches? (15M)

5. a) Write a short note on the air-fuel ratio requirements of a petrol engine from no load to full load?
   b) Describe with a sketch any petrol injection system? (8M+7M)

6. a) What are the requirements of a Diesel injection system?
   b) Explain the air injection in detailed? (8M+7M)

7. a) What are different types of injection nozzles and explain about their characteristics?
   b) Explain the Multihole nozzle with the help of neat sketch? (8M+7M)

8. a) Give the classification of the lubricating oils? What are the properties to be possessed by the lubricating oil?
   b) Explain about the Mist lubricating system with the help of neat sketch? (8M+7M)
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