Register Number: ……..

B.E DEGREE EXAMINATIONS:APRIL/MAY 2014

(Regulation 2009)

Sixth Semester

AUTOMOBILE ENGINEERING

AUE114: Engine Design

(Use of PSG Design Data book is permitted)

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. A square engine means
   a) Bore is square shape b) Piston is square shape
   c) Bore and stroke are equal d) Cylinder length and piston diameter are equal
2. The cylinder arrangement in the high power compact engines is
   a) In line b) Rotary
   c) V –type d) Opposed
3. SI engine pistons are made up of
   a) Cast iron b) Medium carbon steel
   c) Low carbon steel d) Aluminum alloy
4. The small end of the connecting rod is provided with
   a) Ball bearing b) Roller bearing
   c) Bush bearing d) Shell bearing
5. Mostly used firing order in a four cylinder SI engine is
   a) 1-2-3-4 b) 1-3-2-4
   c) 1-3-4-2 d) 2-3-1-4
6. In an even firing six cylinder engine, a firing impulse occurs every
   a) 60° of crankshaft rotation 720° of crankshaft rotation
   c) 30° of crankshaft rotation 120° of crankshaft rotation
7. Dry sump lubrication means
   a) No lubricants are used b) Sump may dry
   c) Separate oil pump is used d) Both b and c
8. Heat transfer through fluids in motion and between a fluid and solid surface in relative motion is called as
   a) Conduction b) Convection

   c) Radiation d) Conduction and convection
9. To increase volumetric efficiency of engines
   a) Inlet valve size can be increased b) Exhaust valve size can be increased
   c) Multiple number of exhaust valves provided d) Inlet value size is reduced
10. In four stroke IC engine, if Cranks shaft rotates at ‘X’ revolution per minute then cam shaft will rotates at
    a) X/2 rpm b) X x 2 rpm
    c) X/4 rpm d) X rpm

PART B (10 x 2 = 20 Marks)

11. Define swept volume.
12. What is under square and over square engines?
13. List out materials used for engine cylinder.
14. Mention few piston failures.
15. State the materials used for crank shaft.
16. How the main bearing of crank shaft is lubricated?
17. Why a thermostat is used in cooling system?
18. What are the key functions of engine lubricants?
19. How can a valve spring be designed?
20. What is meant by over head cam shaft? What are the advantages of it?

PART C (5 x 14 = 70 Marks)

21. a) Discuss elaborately about the selection of engine and determination of engine power.

(OR)

b) Describe the design procedure of theoretical analysis and design considerations.

22. a) (i) Describe the procedure used for the design of engine cylinders. (7)

(ii) Assume suitable data and design a piston. (7)

(OR)

b) (i) Explain how the minimum length of the connecting rod is determined? (7)

(ii) Describe briefly the connecting rod small end design. (7)

23. a) (i) Design a crank shaft for a single cylinder engine. Piston diameter is 93 mm. load acting on crank pin is 55 kPa. Assume distance between centres of bearings as 160 mm and the distance of mid point of crank pin to the left bearing as 90 mm. the crank shaft material has yield strength of 600 MPa and endurance strength of 105 MPa. Allowable bearing pressure is 8 MPa. (10)

(ii) Discuss the design aspects of counterbalancing mass in a crank shaft of single cylinder engine. (4)

(OR)

b) Explain elaborately the design procedure used for the design of crankshaft against bending and twisting.

24. a) (i) Explain the convective and conductive heat transfer in automotive engines. (7)

(ii) Describe the design aspects of engine cooling system components. (7)

(OR)

b) (i) Explain the different types of engine lubricating system. (7)

(ii) Describe the design aspects of engine lubricating system components. (7)

25. a) (i) Discuss in detail the design aspects of inlet and exhaust manifold design. (7)

(ii) Assume suitable data and design a value. (7)

(OR)

b) (i) Discuss the design procedure of engine cam shaft. (7)

(ii) Write a detailed note on cam profile generation. (7)

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