Code : 1GC43

R-11 / R-13

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Environmental Science
(Common to CE, ME & CSE)

Max. Marks: 70   **Time: 03 Hours**

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1.	What is the crisis of the environment? Explain thoroughly the indicators of global environmental crisis.	14M
2.	As per the growing needs, discuss the importance of renewable energy resources against the non-renewable energy resources.	14M
3. a)	What are the environmental hazards associated with mineral extraction?	7M
b)	Explain briefly about equitable use of natural resources for sustainable life style.	7M
4. a)	Discuss the adverse effects and control measures of noise pollution.	8M
b)	What is earthquake? Enumerate its effects?	6M
5. a)	Discuss the process of ecological succession.	7M
b)	Write a brief note on ecological pyramids.	7M
6. a)	Explain about hot-spots of biodiversity.	7M
b)	Discuss regarding biogeographical classification of India.	7M
7. a)	Discuss the concept of sustainable development.	7M
b)	Write about global warming and its effects.	7M
8. a)	Discuss the necessity of value education.	6M
b)	Explain the role of information technology in environment and human health.	8M

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II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019

Kinematics of Machinery

(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

Answer any **five** questions

All Questions carry equal marks (**14 Marks** each)

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1. Explain the inversions of a single slider crank chain mechanism and its applications with neat sketches. **14M**

2. Draw a neat sketch of a Davis steering gear, and show that it satisfies the condition for correct steering in all positions. **14M**

3. a) State and prove the 'Kennedy's Theorem' of three instantaneous centers **6M**

    b) In a four-bar chain ABCD, AD is fixed and is 150 mm long. The crank AB is 40 mm long and rotates at 120 r.p.m. clockwise, while the link CD = 80 mm oscillates about D. BC and AD are of equal length. Find the angular velocity of link CD when angle BAD = 60°. **8M**

4. The crank of a slider crank mechanism rotates clockwise at a constant speed of 300 r.p.m. The crank is 150 mm and the connecting rod is 600 mm long. Determine: 1. Linear velocity and acceleration of the midpoint of the connecting rod, and 2. angular velocity and angular acceleration of the connecting rod, at a crank angle of 45° from inner dead centre position **14M**

5. A cam with a minimum radius of 25 mm, rotating clockwise at a uniform speed is to be designed to give a roller follower, at the end of a valve rod, motion described below: 1. To raise the valve through 50 mm during 120° rotation of the cam; 2. To keep the valve fully raised through next 30°; 3. To lower the valve during next 60°; and 4. To keep the valve closed during rest of the revolution i.e. 150°; The diameter of the roller is 20 mm and the diameter of the cam shaft is 25 mm. Draw the profile of the cam when the line of stroke of the valve rod passes through the axis of the cam shaft. The displacement of the valve, while being raised and lowered, is to take place with simple harmonic motion. Determine the maximum acceleration of the valve rod when the cam shaft rotates at 100 r.p.m. Draw the displacement, the velocity and the acceleration diagrams for one complete revolution of the cam. **14M**

6. Two mating gears with 6 mm module have 30 teeth and 75 teeth. The addendum is standard one module. Pressure angle is 20^0. Find: i) pitch diameters, ii) center distance iii) length of path of contact, iv) length of arc of contact and v) contact ratio. **14M**

7. a) Derive the condition for transmitting the maximum power in a flat belt drive. **7M**

    b) An engine, running at 150 r.p.m., drives a line shaft by means of a belt. The engine pulley is 750 mm diameter and the pulley on the line shaft being 450 mm. A 900 mm diameter pulley on the line shaft drives a 150 mm diameter pulley keyed to a dynamo shaft. Find the speed of the dynamo shaft, when 1. there is no slip, and 2. there is a slip of 2% at each drive. **7M**

8. a) What do you understand by 'gear train'? Discuss the various types of gear trains. **7M**

    b) Two parallel shafts, about 600 mm apart are to be connected by spur gears. One shaft is to run at 360 r.p.m. and the other at 120 r.p.m. Design the gears, if the circular pitch is to be 25mm. **7M**

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Code: 1G544

II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Manufacturing Technology
(Mechanical Engineering)

Max. Marks: 70   Time: 3 Hours

Answer any **five** questions
All Questions carry equal marks (**14 Marks** each)
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1. a) Illustrate the differences between a pattern and a casting?

   b) List out What are the allowances provided when making a pattern?

2.   Explain in brief the mechanism of solidification of casting of pure metals. Also explain Time-temperature cooling curve of a casting.

3. a) How is an arc obtained in arc welding?

   b) Differentiate between Gas Welding and Arc Welding?

4. a) Why is it necessary to use filler material in welding with tungsten inert gas welding? Give reasons.

   b) Sketch the outline of the TIG welding process?

5. a) Explain the function of working rolls and support rolls.

   b) Classify various type of rolling mills and explain in detail?

6. a) Differentiate between blanking and piercing

   b) Write short notes on

      (i) Notching   (ii) Nibbling   (iii) Shaving

7. a) What are the causes of defects in forging?

   b) Elaborate the 'extrusion defects'

8. a) Write a short note on

      (i) Electric discharge machining (ii) Electron beam machining

   b) Briefly explain laser assisted machining with neat sketch

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II B.Tech. II Semester Supplementary Examinations Nov/Dec 2019
Thermal Engineering -I
(Mechanical Engineering)

Max. Marks: 70   Time: 03 Hours

Answer *any five* questions
All Questions carry equal marks (14 Marks each)
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1. a) An engine of 250 mm bore and 375 mm stroke works on otto cycle. The clearance volume is 0.00263 m^3 . the initial pressure and temperature are 1 bar and 50^0 C. if the maximum pressure is limited to 25 bar, find the following:
   i) The air standard efficiency of the cycle.
   ii) The mean effective pressure of the cycle.
   Assume the ideal conditions.   7M

   b) Derive expression for efficiency in the folloing cases:
         i) Carnot cycle
         ii) Diesel cycle
         iii) Dual combustion cycle   7M

2. a) Compare and contrast the differences between S.I engines with C.I engine?   7M

   b) What is meant by mechanical cycle of I.C engine operation and explain the types? 7M

3. a) Explain the phenomena of knocking in diesel engines. What are the different factors which influence the knocking?   7M

   b) Discuss the difference between Normal/abnormal combustion and pre ignition   7M

4. Explain and discuss the phenomenon of diesel knock in C.I engines and compare the same with detonation in S.I engine.   14M

5. 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 76 cm of Hg. Temperature of air is in the room is 24^0 C. 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 44000 kJ/kg. the brake power developed at 2500 rpm is 28 kW. Determine: **i)** Air-Fuel ratio **ii)** Volumetric efficiency on the basis of air alone **iii)** Brake mean effective pressure and **iv)** Relative efficiency on the brake thermal efficiency basis.   14M

6. a) In the construction and working of Multi stage compressor and discuss the perfect and imperfect inter cooling with neat sketch.   7M

   b) A single stage, single acting reciprocating air compressor has a bore of 0.2 m and stroke of 0.3 m. It receives air at 1 bar and 293 K and delivers it at 5.5 bar. If the compression follows the law $pV^{1.3}$ = constant and clearance volume is 5% of the stroke volume, Determine the mean effective pressure and the power required to drive the compressor, if it runs at 500 rpm.   7M

7. a) Explain the construction and working principle of centrifugal compressor with neat sketch.   7M

   b) A centrifugal air compressor having a pressure compression ratio of 5 compresses air at the rate of 10kg/s. if the initial pressure and temperature of the air is 1 bar and 20^0 C, find; 1. The final temperature of the gas , and 2. Power required driving the compressor. Take gamma=1.4 and C_p =1 kJ/kg.K.   7M

8. An axial flow compressor having eight stages and with 50% reaction design compresses air in the pressure ratio of 4:1. The air enters the compressor at 20^0C and flows through it with a constant speed of 90 m/s. The rotating blades of compressor rotate with a mean speed of 180 m/s. Isentropic efficiency of the compressor may be taken as 82%. Calculate :
   i) Work done by the machine
   ii) Blades angle   14M

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