



Name: ..... Roll No.: .....

Branch: ..... Signature of Invigilator: .....

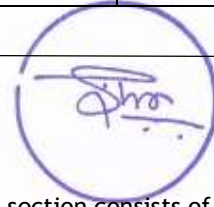
Semester: VIth

Date: 02/05/2022 (MORNING)

Subject with Code: ME301 IC ENGINES & GAS TURBINES

Marks Obtained	Section A (30)	Section B (20)	Total Marks (50)

INSTRUCTION TO CANDIDATE



1. The booklet (question paper cum answer sheet) consists of two sections. First section consists of MCQs of 30 marks. Candidates may mark the correct answer in the space provided / may also write answers in the answer sheet provided. The Second section of question paper consists of subjective questions of 20 marks. The candidates may write the answers for these questions in the answer sheets provided with the question booklet.
2. The booklet will be distributed to the candidates before 05 minutes of the examination. Candidates should write their roll no. in each page of the booklet.
3. Place the Student ID card, Registration Slip and No Dues Clearance (if applicable) on your desk. All the entries on the cover page must be filled at the specified space.
4. Carrying or using of mobile phone / any electronic gadgets (except regular scientific calculator)/chits are strictly prohibited inside the examination hall as it comes under the category of unfair means.
5. No candidate should be allowed to enter the examination hall later than 10 minutes after the commencement of examination. Candidates are not allowed to go out of the examination hall/room during the first 30 minutes and last 10 minutes of the examination.
6. Write on both side of the leaf and use pens with same ink.
7. The medium of examination is English. Answer book written in language other than English is liable to be rejected.
8. All attached sheets such as graph papers, drawing sheets etc. should be properly folded to the size of the answer book and tagged with the answer book by the candidate at least 05 minutes before the end of examination.
9. The door of examination hall will be closed 10 minutes before the end of examination. Do not leave the examination hall until the invigilators instruct you to do so.
10. Always maintain the highest level of integrity. Remember you are a BITian.
11. Candidates need to submit the question paper cum answer sheets before leaving the examination hall.

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI				
(END SEMESTER EXAMINATION)				
<b>CLASS:</b>	<b>B. Tech</b>			<b>SEMESTER: VI (Minor)</b>
<b>BRANCH:</b>	Production and Industrial Engineering			<b>SESSION : SP/22</b>
<b>SUBJECT: I C Engine and Gas Turbine (ME 301)</b>				
<b>TIME:</b>	<b>10AM-12PM</b>			<b>FULL MARKS: 50</b>
<b>INSTRUCTIONS:</b>				
<ol style="list-style-type: none"> <li>1. The question paper contains 5 questions each of 10 marks and total 50 marks.</li> <li>2. Attempt all questions.</li> <li>3. The missing data, if any, may be assumed suitably.</li> <li>4. Before attempting the question paper, be sure that you have got the correct question paper.</li> <li>5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.</li> </ol>				
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### Objective Questions

1. If the temperature of intake air in internal combustion engine increases, then its efficiency will  
 A) Remain same (B) Decrease (C) Increase (D) None of these
2. The operation of forcing additional air under pressure in the engine cylinder is known as  
 (A) Scavenging (B) Turbulence (C) Supercharging (D) Pre-ignition
3. The ignition quality of petrol is expressed by  
 (A) Cetane number (B) Octane number (C) Calorific value (D) All of these
4. The mean effective pressure obtained from engine indicator indicates the  
 (A) Maximum pressure developed (B) Minimum pressure  
 (C) Instantaneous pressure at any instant (D) Average pressure
5. The probability of knocking in diesel engines is increased by  
 (A) High self ignition temperature (B) Low volatility (C) Higher viscosity (D) All of these
6. Pour point of fuel oil is the  
 (A) Minimum temperature to which oil is heated in order to give off inflammable vapours in sufficient quantity to ignite momentarily when brought in contact with a flame  
 (B) Temperature at which it solidifies or congeals  
 (C) It catches fire without external aid  
 (D) Indicated by 90% distillation temperature i.e., when 90% of sample oil has distilled off

7. In a four stroke cycle petrol engine, the compression  
 (A) Starts at  $40^\circ$  after bottom dead centre and ends at  $30^\circ$  before top dead centre  
 (B) Starts at  $40^\circ$  before bottom dead centre and ends at  $30^\circ$  after bottom dead centre  
 (C) Starts at bottom dead centre and ends at top dead centre  
 (D) May start and end anywhere
8. The maximum temperature in the I.C. engine cylinder is of the order of  
 (A)  $500-1000^\circ\text{C}$ (B)  $1000-1500^\circ\text{C}$ (C)  $1500-2000^\circ\text{C}$ (D)  $2000-2500^\circ\text{C}$
9. In compression ignition engines, swirl denotes a  
 (A) Haphazard motion of the gases in the chamber (B) Rotary motion of the gases in the chamber (C) Radial motion of the gases in the chamber (D) None of the above
10. Supercharging is the process of  
 (A) Supplying the intake of an engine with air at a density greater than the density of the surrounding atmosphere  
 (B) Providing forced cooling air (C) Injecting excess fuel for raising more loads  
 (D) Supplying compressed air to remove combustion products fully
11. The knocking in spark ignition engines can be reduced by  
 (A) Retarding the spark (B) Increasing the engine speed(C) Both (A) and (B) (D) None of these
12. An engine indicator is used to determine the following  
 (A) Speed (B) Temperature (C) Volume of cylinder (D) m.e.p. and I.H.P.
13. In a four stroke cycle diesel engine, the exhaust valve  
 (A) Opens at  $30^\circ$  before bottom dead centre and closes at  $10^\circ$  after top dead centre  
 (B) Opens at  $30^\circ$  after bottom dead centre and closes at  $10^\circ$  before top dead centre  
 (C) Opens at bottom dead centre and closes at top dead centre  
 (D) May open and close anywhere
14. The pressure at the end of compression in the case of diesel engine is of the order of  
 (A)  $6\text{ kg/cm}$  (B)  $12\text{ kg/cm}$  (C)  $20\text{ kg/cm}$  (D)  $35\text{ kg/cm}$
15. The fuels in order of decreasing knock tendency for spark ignition engines are  
 (A) Paraffin, aromatic, naphthene(B) Paraffin, naphthene, aromatic  
 (C) Napthene, aromatics, paraffin (D) Napthene, paraffin, aromatic
16. The brake power is the power available  
 (A) In the engine cylinder (B) At the crank shaft (C) At the crank pin (D) None of these
17. The normal heptane ( $\text{C}_7\text{H}_{16}$ ) is given a rating of \_\_\_\_\_ octane number.  
 (A) 0 (B) 50 (C) 100 (D) 120

18. The knocking in diesel engines may be prevented by  
(A) Reducing the delay period (B) Raising the compression ratio (C) Increasing the inlet pressure of air (D) All of these
19. The air-fuel ratio of the petrol engine is controlled by  
(A) Carburettor (B) Injector (C) Governor (D) None of these
20. If the compression ratio in I.C. engine increases, then its thermal efficiency will  
(A) Decrease (B) Increase (C) Remain same (D) None of these
21. The thermal efficiency of a standard Otto cycle for a compression ratio of 5.5 will be  
(A) 25% (B) 50% (C) 70% (D) 100%
22. The octane number of petrol, generally available, is  
(A) 20 to 40 (B) 40 to 60 (C) 60 to 80 (D) 80 to 100
23. The object of supercharging the engine is  
(A) To reduce mass of the engine per brake power (B) To reduce space occupied by the engine  
(C) To increase the power output of an engine when greater power is required (D) All of the above
24. The increase of cooling water temperature in petrol engine will \_\_\_\_\_ the knocking tendency.  
(A) Not effect (B) Decrease (C) Increase (D) None of these
25. The specific fuel consumption per B.P. hour for a diesel engine is about  
(A) 0.2 kg (B) 0.25 kg (C) 0.3 kg (D) 0.35 kg
26. The injection pressure in a diesel engine is about  
(A) 10 bar (B) 100 bar (C) 150 bar (D) 500 bar
27. Morse test is used to determine the I.P. of a  
(A) Single cylinder petrol engine (B) Four stroke engine (C) Single cylinder diesel engine (D) Multi cylinder engine
28. The voltage required to produce a spark across the gap, between the sparking points is  
(A) 2000 to 4000 volts (B) 4000 to 6000 volts (C) 6000 to 10,000 volts (D) 10,000 to 12,000 volts
29. The compression ignition engines are governed by  
(A) Hit and miss governing (B) Qualitative governing (C) Quantitative governing  
(D) Combination of (B) and (C)
30. The reason for supercharging in any engine is to  
(A) Increase efficiency (B) Increase power (C) Reduce weight and bulk for a given output  
(D) Effect fuel economy

### **Short Questions**

31.	Outline the various aspect of valve timing diagram [CO1, IO(Intermediate Order), PO2-3.]	[5]
32.	Outline the various factors of fuel air cycle and actual air cycle. [CO1, IO(Intermediate Order) PO2-3.]	[5]
33.	Outline the various factors for combustion of CI and SI engine with suitable diagram. [CO2, IO(Intermediate Order)PO2-3.]	[5]
34.	Outline the various factors for ignition delay, knocking and detonation with suitable diagram [CO2, IO(Intermediate Order)PO2-3.]	[5]