

Exam Name

FINAL ANSWER KEY

Paper Name: Scientist B (Mechanical engineering)

Paper Code: SB - MECH

Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key
01	B	12	A	23	B	34	C	45	D	56	C
02	B	13	A	24	D	35	A	46	C	57	D
03	C	14	A	25	B	36	B	47	B	58	B
04	B	15	B	26	C	37	D	48	D	59	MTA
05	A, C	16	A	27	A	38	C	49	B	60	C
06	B	17	A	28	B	39	D	50	D	61	A
07	A	18	B	29	D	40	D	51	B	62	B
08	B	19	D	30	D	41	B	52	D	63	D
09	B	20	C	31	C	42	D	53	A	64	B
10	C	21	B	32	D	43	B	54	B	65	C
11	D	22	A	33	C	44	B	55	D	66	C

Exam Name

Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key	Q. No.	Key
67	D	78	B	89	D	100	B	111	C		
68	B	79	D	90	A	101	D	112	A		
69	C	80	B	91	D	102	D	113	B		
70	A	81	B	92	A	103	MTA	114	D		
71	A	82	A	93	C	104	A	115	MTA		
72	B	83	C	94	A, B, D	105	MTA	116	D		
73	C	84	B	95	C	106	C	117	A		
74	A	85	A	96	D	107	D	118	B		
75	A	86	B	97	C	108	B	119	A		
76	D	87	B	98	B	109	A	120	B		
77	D	88	A	99	D	110	D				

Note: **MTA** stands for **Marks To All**.

Question Paper

Question Paper Name :	Scientist B Mechanical Engineering
Subject Name :	Scientist B Mechanical Engineering
Creation Date :	2021-09-08 13:20:08
Duration :	120
Total Marks :	120
Display Marks:	Yes
Calculator :	Scientific
Magnifying Glass Required? :	No
Ruler Required? :	No
Eraser Required? :	No
Scratch Pad Required? :	No
Rough Sketch/Notepad Required? :	No
Protractor Required? :	No
Show Watermark on Console? :	Yes
Highlighter :	No
Auto Save on Console? (SA type of questions will be always auto saved) :	No

Scientist B Mechanical Engineering

Group Number :	1
Group Id :	267236131

Group Maximum Duration :	0
Group Minimum Duration :	120
Show Attended Group? :	No
Edit Attended Group? :	No
Break time :	0
Group Marks :	120
Is this Group for Examiner? :	No

Scientist B Mechanical Engineering

Section Id :	267236259
Section Number :	1
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	120
Number of Questions to be attempted :	120
Section Marks :	120
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Sub-Section Number :	1
Sub-Section Id :	267236377
Question Shuffling Allowed :	Yes

Question Number : 1 Question Id : 26723610221 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Noise pollution has been inserted as pollution in the Air Act in:

(A) 1981

(B) 1987

(C) 1986

(D) 1974

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 2 Question Id : 26723610222 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The Water (Prevention and Control of Pollution) Act was enacted in the year:

(A) 1981

(B) 1974

(C) 1986

(D) 2000

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✖ D

Question Number : 3 Question Id : 26723610223 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

What is the most abundant greenhouse gas in the atmosphere?

- (A) Methane
- (B) Nitrogen dioxide
- (C) Water vapor
- (D) Carbon dioxide

Options :

- 1. ✔ A
- 2. ✖ B
- 3. ✖ C
- 4. ✖ D

Question Number : 4 Question Id : 26723610224 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which of the following is responsible for reducing global CFC production by half?

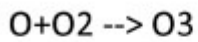
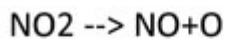
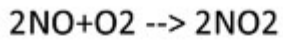
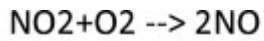
- (A) Copenhagen Protocol
- (B) Montreal Protocol
- (C) Kyoto Protocol
- (D) Convention on Long-Range Transboundary Air Pollution

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 5 Question Id : 26723610225 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25



The above reactions describe the chemical process that forms:

- (A) Photochemical smog
- (B) Acid precipitation
- (C) Ozone
- (D) Peroxyacetyl nitrate

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 6 Question Id : 26723610226 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

5th June is observed as

- (A) World forest day
- (B) World environment day
- (C) World wildlife day
- (D) World population day

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 7 Question Id : 26723610227 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which of the following types of electricity generation produces the least amount of greenhouse-gas emissions from cradle to grave?

- (A) Nuclear
- (B) Natural gas
- (C) Biomass
- (D) Oil

Options :

- 1. ✓ A
- 2. ✗ B

3. ✖ C

4. ✖ D

Question Number : 8 Question Id : 26723610228 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In which of the following ecosystems do tree roots serve as important havens for biodiversity?

(A) Coral reefs

(B) Mangrove forests

(C) Estuaries

(D) Freshwater wetlands

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 9 Question Id : 26723610229 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The total salary of A, B, C is Rs. 444. If they spend 80%, 85%, 75% of their salaries, respectively, their savings are as 7 : 6 : 9. The salary of B is

(A) Rs. 140

(B) Rs. 160

(C) Rs. 144

(D) Rs. 156

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 10 Question Id : 26723610230 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A sum of money invested at compound interest amounts to Rs. 650 at the end of first year and Rs. 676 at the end of second year. The sum of money is:

(A) Rs. 600

(B) Rs. 540

(C) Rs. 625

(D) Rs. 560

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 11 Question Id : 26723610231 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

What is the height of a solid cylinder of radius 5 cm and total surface area is 660 sqcm?

- (A) 10 cm
- (B) 12 cm
- (C) 15 cm
- (D) 16 cm

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 12 Question Id : 26723610232 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a test paper there are total 10 questions. In how many different ways can you choose 6 questions to answer?

- (A) 210
- (B) 540
- (C) 336
- (D) None of these

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 13 Question Id : 26723610233 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A box contains 5 defective and 15 non-defective bulbs. Two bulbs are chosen at random. Find the probability that both the bulbs are non-defective.

- (A) $21/38$
- (B) $3/20$
- (C) $5/19$
- (D) None of these

Options :

- 1. ✓ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 14 Question Id : 26723610234 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The average rainfall in the months of January and February is 6 cm and in the months of March to June is 5 cm and July to October is 10 cm and, in the months of November and December, it is 6 cm. The average rainfall for the whole year is:

(A) 7

(B) 5.5

(C) 7.5

(D) None of these

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 15 Question Id : 26723610235 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The average age of all the 100 employees in an office is 29 years, where $\frac{2}{5}$ employees are ladies and the ratio of average age of men to women is 5 : 7. The average age of female employees is:

- (A) 18 years
- (B) 35 years
- (C) 25 years
- (D) 27 years

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 16 Question Id : 26723610236 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The Narendra Modi Stadium was previously known as

- (A) Motera Stadium
- (B) Ahmed Patel Stadium
- (C) Ahmedabad Stadium
- (D) Morar ji Stadium

Options :

- 1. ✓ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 17 Question Id : 26723610237 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Carbon dioxide constitutes about _____ percentage of the air?

(A) 0.03

(B) 0.3

(C) 3

(D) 30

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 18 Question Id : 26723610238 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

When India got independence, the Prime Minister of England was:

- (A) Winston Churchill
- (B) Clement R. Atlee
- (C) Neville Chamberlain
- (D) Harold Macmillan

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 19 Question Id : 26723610239 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Gandhiji's Champaran Movement was for:

- (A) The security of rights of Harijans
- (B) Maintaining the unity of Hindu Society
- (C) Civil Disobedience Movement
- (D) Solving the problem of the indigo workers

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C

4. ✖ D

Question Number : 20 Question Id : 26723610240 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

India liberated Goa from Portuguese in

(A) 1950

(B) 1965

(C) 1961

(D) 1947

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 21 Question Id : 26723610241 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Who among the following won the highest number of National film awards in acting?

(A) Amitabh Bachhan

(B) Shabana Azmi

(C) Satyajit Ray

(D) Kamal Haasan

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 22 Question Id : 26723610242 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which among the following is the largest Hindu temple in the world?

- (A) Angkorwat (Cambodia)
- (B) Akshardham (Delhi)
- (C) Belur Math (Howrah)
- (D) Brihadeshwar (Jhanjavar)

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 23 Question Id : 26723610243 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Tsunami is the result of?

(A) Shrining of Earth's crust

(B) Submarine Earthquakes

(C) Cyclones

(D) Tides

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 24 Question Id : 26723610244 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The instrument used for recording earthquake wavers is:

(A) Barograph

(B) Hydrograph

(C) Pantograph

(D) Seismograph

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✖ D

Question Number : 25 Question Id : 26723610245 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The Tropic of Cancer does not pass through:

- (A) Gujarat
- (B) Odisha
- (C) Tripura
- (D) West Bengal

Options :

- 1. ✔ A
- 2. ✖ B
- 3. ✖ C
- 4. ✖ D

Question Number : 26 Question Id : 26723610246 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Water stored in a dam possesses:

- (A) No energy
- (B) Kinetic energy
- (C) Potential energy
- (D) Electrical energy

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 27 Question Id : 26723610247 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which of the following is best conductor of electricity?

- (A) Silver
- (B) Mercury
- (C) Platinum
- (D) Copper

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 28 Question Id : 26723610248 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

-40° Fahrenheit is equal to:

(A) -20° centigrade

(B) -40° centigrade

(C) -10° centigrade

(D) -80° centigrade

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 29 Question Id : 26723610249 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A family consists of six members. There is at least one married couple in the family.

- I. Venkat is not the husband of Savita.
- II. Charan is the brother of Jyothi.
- III. Jyothi is not the wife of Ravi.
- IV. Sekhar is the grandfather of Charan.
- V. Jyothi is Savita's daughter.
- VI. Savita's husband is living with her.

If Sekhar has his two children living with him, which of the following pairs can be siblings?

- (A) Ravi & Venkat
- (B) Sekhar & Ravi
- (C) Venkat & Savita
- (D) Either A or C

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 30 Question Id : 26723610250 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Seven villages A, B, C, D, E, F and G are situated as follows:

E is 2km to the west of B.

F is 2km to the north of A.

C is 1km to the west of A.

D is 2km to the south of G.

G is 2km to the east of C.

D is exactly in the middle of B and E.

A is in the middle of:

(A) E and C

(B) F and E

(C) F and G

(D) G and C

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 31 Question Id : 26723610251 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The statement given below is followed by two arguments numbered I and II. You have to decide which of the following arguments a “strong” argument is and which a “weak” argument is.

Statement: Should the Government introduce Gross Happiness Index on the lines of that introduced in Bhutan?

Arguments: I. Yes. It will greatly help India in becoming a prosperous nation.
II. No. Bhutan has not gone anywhere even after introducing GHI over four decades ago.

(A) If only argument I is strong

(B) If only argument II is strong

(C) If neither I nor II is strong

(D) If both I and II are strong

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 32 Question Id : 26723610252 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Choose the most appropriate answer

Statement (1): Due to deforestation, the chances of flooding have increased in city X.

Statement (2): City X suffered from disrupted water flow.

- (A) I is the cause and II is the effect
- (B) II is the cause and I is the effect
- (C) Both I and II are independent causes
- (D) Both I and II are effects of common causes

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 33 Question Id : 26723610253 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In the following questions, the first and the last parts of the sentence are numbered 1 and 6. The rest of the sentence is split into four parts and named P, Q, R, and S. These four parts are not given in their proper order. Read the sentence and find out which of the four combinations is correct. Then find the correct answer.

1.A dictionary

P.arranged words

Q.about which information

R.containing alphabetically

S.is a book

6.is given.

(A) RPQS

(B) RPSQ

(C) SRPQ

(D) SPRQ

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 34 Question Id : 26723610254 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Choose the option that exhibits the same analogy.

Artist : Canvas ::

- (A) Driver : Car
- (B) Pedestrian : Road
- (C) Composer : Symphony
- (D) Surgeon : Operation

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 35 Question Id : 26723610255 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Choose the alternative which best expresses the meaning of the idiom/.phrase printed in bold type.

To hold somebody to ransom

- (A) To keep captive and demand concession
- (B) To humiliate somebody
- (C) To offer bribe
- (D) To blackmail and extract money

Options :

- 1. ✓ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 36 Question Id : 26723610256 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In following questions, groups of words are given. In each group, one word is correctly spelt. Find the correctly spelt word.

(A) Asassin

(B) Assassin

(C) Assasin

(D) Assassen

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 37 Question Id : 26723610257 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Consider the following properties:

1. Temperature
2. Viscosity
3. Specific entropy
4. Thermal conductivity

Which of the above properties of a system is/are intensive?

- (A) 1 only
- (B) 2 and 3 only
- (C) 2,3 and 4 only
- (D) 1, 2, 3 and 4

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 38 Question Id : 26723610258 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which of the following parameters is significant to ascertain chemical equilibrium of a system?

- (A) Clapeyron relation
- (B) Maxwell relation
- (C) Gibbs function
- (D) Helmboltz function

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 39 Question Id : 26723610259 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Work transfer between the system and surroundings:

- (A) is a point function
- (B) is always given by $\int p dv$
- (C) is function of pressure only
- (D) depends on the path followed by the system

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 40 Question Id : 26723610260 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A new temperature scale in degrees N is to be defined. The boiling and freezing points of water on this scale are 400° N and 100° N respectively. What will be the reading on new scale corresponding to 60° C?

(A) 120° N

(B) 180° N

(C) 220° N

(D) 280° N

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 41 Question Id : 26723610261 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A steam turbine receives steam steadily at 10 bar with an enthalpy of 3000 kJ/kg and discharges at 1 bar with an enthalpy of 2700 kJ/kg. The work output is 250 kJ/kg. The changes in kinetic and potential energies are negligible. The heat transfer from the turbine casing to the surroundings is equal to:

- (A) 0 kJ
- (B) 50 kJ
- (C) 150 kJ
- (D) 250 kJ

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 42 Question Id : 26723610262 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Suppose 0.70 kg/s of air enters the compressor with a specific enthalpy of 290 kJ/kg and leaves it with specific enthalpy 450 kJ/kg and velocities at inlet and exit are 6 m/s and 2 m/s, respectively. Assuming adiabatic process, what is power input to the compressor?

(A) 100 kW

(B) 118 kW

(C) 115 kW

(D) 112 kW

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 43 Question Id : 26723610263 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

For two cycles coupled in series, the topping (upper) cycle has an efficiency of 30% and the bottoming cycle has an efficiency of 20%. The overall combined cycle efficiency is:

(A) 50%

(B) 44%

(C) 38%

(D) 55%

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 44 Question Id : 26723610264 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

For a thermodynamics cycle to be irreversible, it is necessary that:

(A) $\oint \frac{\delta Q}{T} = 0$

(B) $\oint \frac{\delta Q}{T} < 0$

(C) $\oint \frac{\delta Q}{T} > 0$

(D) $\oint \frac{\delta Q}{T} \geq 0$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 45 Question Id : 26723610265 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A heat pump working on a reversed Carnot cycle has a COP of 5. If it works as a refrigerator taking 1 kW of work input, the refrigeration effect will be:

(A) 1 kW

(B) 2 kW

(C) 3 kW

(D) 4 kW

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 46 Question Id : 26723610266 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A reversible engine operates between temperatures T_1 and T_2 . The energy rejected by this engine is received by a second reversible engine at temperature T_2 and rejected to a reservoir at temperature T_3 . If the efficiencies of both the engines are same then the relationship between T_1 , T_2 and T_3 is given by:

(A) $T_2 = (1/2)[(T_1) + (T_3)]$

(B) $T_2 = [(T_1)^2 + (T_3)^2]^{(1/2)}$

(C) $T_2 = [(T_1) (T_3)]^{(1/2)}$

(D) $T_2 = (1/3)[(T_1) + 2(T_3)]$

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 47 Question Id : 26723610267 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Consider the following:

1. Air
2. Gaseous combustion product
3. Steam

Which of these are pure substances, assuming there is no phase change?

- (A) 1 and 2 only
- (B) 1 and 3 only
- (C) 2 and 3 only
- (D) 1, 2 and 3 only

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 48 Question Id : 26723610268 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The van der Waals equation:

1. The mass of each molecule of the gas
2. The volume of each molecule of the gas
3. The attractive forces between molecules of the gas.

- (A) 1 and 3 only
- (B) 2 and 3 only
- (C) 1 and 2 only
- (D) 1, 2 and 3 only

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 49 Question Id : 26723610269 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A four stage compressor with perfect intercooling between stages, compresses air from 1 bar to 16 bar. The optimum pressure in the last intercooler will be:

- (A) 6 bar
- (B) 8 bar
- (C) 10 bar
- (D) 12 bar

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 50 Question Id : 26723610270 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The volumetric efficiency of a compressor depends upon:

1. clearance volume
2. pressure ratio
3. Index of expansion

Of these statements

- (A) 1 and 2 are correct
- (B) 1 and 3 are correct
- (C) 2 and 3 are correct
- (D) 1, 2 and 3 are correct

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 51 Question Id : 26723610271 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Phenomenon of choking in compressors means:

- (A) no flow of air
- (B) fixed mass flow rate regardless of pressure ratio
- (C) reducing mass flow rate with increase in pressure ratio
- (D) increased inclination of chord with air stream

Options :

1. ✓ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 52 Question Id : 26723610272 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a gas turbine cycle, the turbine output is 600 kJ/kg, the compressor work is 400 kJ/kg and the heat supplied is 1000 kJ/kg. The thermal efficiency of the cycle is:

(A) 80%

(B) 60%

(C) 40%

(D) 20%

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 53 Question Id : 26723610273 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A gas turbine works on which of the following cycle:

- (A) Brayton cycle
- (B) Rankine cycle
- (C) Stirling cycle
- (D) Otto cycle

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 54 Question Id : 26723610274 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Increasing the number of reheating stages in a gas turbine to infinity makes the expansion tending:

- (A) reversible adiabatic
- (B) isothermal
- (C) isobaric
- (D) isochoric

Options :

- 1. ✓ A
- 2. ✗ B

3. ✘ C

4. ✘ D

Question Number : 55 Question Id : 26723610275 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

When T_{c1} and T_{c2} are the temperatures of cold fluid at entry and exit, respectively.

Also T_{h1} and T_{h2} are the temperatures of hot fluid at the entry and exit respectively.

When cold fluid has lower heat capacity rate as compared to hot fluid, then effectiveness of the heat exchanger is given by:

(A) $(T_{c1} - T_{c2}) / (T_{h1} - T_{c1})$

(B) $(T_{h2} - T_{h1}) / (T_{c2} - T_{h1})$

(C) $(T_{h1} - T_{h2}) / (T_{h1} - T_{c1})$

(D) $(T_{c2} - T_{c1}) / (T_{h1} - T_{c1})$

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 56 Question Id : 26723610276 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a counter flow heat exchanger, the product of specific heat and mass flow rate is same for the hot and the cold fluids. If NTU is equal to 0.5, then the effectiveness of the heat exchanger is:

(A) 1.0

(B) 0.5

(C) 0.33

(D) 0.2

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 57 Question Id : 26723610277 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

If the temperature of solid surface changes from 27°C to 627°C , then its emissive power will increase in the ratio of:

(A) 3

(B) 9

(C) 27

(D) 81

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 58 Question Id : 26723610278 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Match List I and List II and select the correct answer:

List I		List II	
A	Reynolds number	1	Film coefficient, pipe diameter, thermal conductivity
B	Prandtl number	2	Flow velocity, acoustic velocity
C	Nusselt number	3	Heat capacity, dynamic viscosity, thermal conductivity
D	Mach number	4	Flow velocity, pipe diameter, kinematic viscosity

(A) A-4, B-1, C-3, D-2

(B) A-4, B-3, C-1, D-2

(C) A-2, B-3, C-1, D-4

(D) A-2, B-1, C-3, D-4

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 59 Question Id : 26723610279 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A composite slab has two layers of different materials with thermal conductivity k_1 and k_2 . If each layer has the same thickness, the equivalent thermal conductivity of the slab would be:

(A) $(k_1 k_2)^{1/2}$

(B) $k_1 + k_2$

(C) $(k_1 + k_2) / (k_1 k_2)$

(D) $(k_1 k_2) (k_1 + k_2)$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 60 Question Id : 26723610280 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Match List I and List II and select the correct option:

List I		List II	
A	Toughness	1	Moment area method
B	Endurance strength	2	Hardness
C	Resistance to abrasion	3	Energy absorbed before failure in a tension test
D	Deflection in the beam	4	Fatigue loading

(A) A-4, B-3, C-1, D-2

(B) A-4, B-3, C-2, D-1

(C) A-3, B-4, C-2, D-1

(D) A-3, B-4, C-1, D-2

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 61 Question Id : 26723610281 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

According to Gibbs phase rule, the number of degree of freedom of eutectic point in a binary system is

(A) 0

(B) 1

(C) 2

(D) 3

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 62 Question Id : 26723610282 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

To reduce the possibility of knock in CI engine, the first element of fuel and air should have

(A) a low temperature

(B) a short delay period

(C) a low density

(D) non-reactive mixture

Options :

1. ✓ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 63 Question Id : 26723610283 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Knocking phenomenon in SI engine is prevented if the end gas has a

(A) a high temperature

(B) a high density

(C) stoichiometric mixture

(D) a long ignition delay

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 64 Question Id : 26723610284 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The bore and stroke of the cylinder of a 6-cylinder engine working on an Otto-cycle are 17 cm and 30 cm respectively, total clearance volume is 10000 cm^3 , then what is the compression ratio?

(A) 6.1

(B) 5.1

(C) 4.1

(D) 3.1

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 65 Question Id : 26723610285 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

An engine produces 12 kW break power while working with a break thermal efficiency of 30%. If the calorific value of the fuel used is 40000 kJ/kg , then what is the fuel consumption?

(A) 2.4

(B) 3.0

(C) 3.6

(D) 4.2

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 66 Question Id : 26723610286 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The main objective of Morse test is to determine:

- (A) performance of a petrol engine
- (B) performance of a diesel engine
- (C) frictional power of a petrol engine
- (D) indicated power of a single cylinder diesel engine

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 67 Question Id : 26723610287 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Match List I with List II related to operation of SI engines and select the correct answer using the codes below:

List I		List II	
Operating mode		Air fuel ratio	
A	Idling	1	12.5
B	Cold starting	2	9.0
C	Crushing	3	16.0
D	Maximum power	4	22.0
		5	3.0

(A) A-2, B-4, C-5, D-1

(B) A-1, B-3, C-4, D-2

(C) A-5, B-2, C-1, D-3

(D) A-2, B-5, C-3, D-1

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 68 Question Id : 26723610288 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The combustion analysis carried out by the Orsat Apparatus renders which of the following?

- (A) the % composition by weight on the dry basis
- (B) the % composition by volume on the dry basis
- (C) the % composition by weight on the wet basis
- (D) none of the above

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 69 Question Id : 26723610289 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

On T-s diagram the change of state during transformation of water from 20°C to 20°C steam at atmospheric pressure due to addition of heat can be represented by:

- (A) slant line
- (B) vertical line
- (C) horizontal line
- (D) none of the above

Options :

- 1. ✓ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 70 Question Id : 26723610290 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The ratio of actual work available at the turbine to energy imparted to the wheel is called:

(A) mechanical efficiency

(B) overall efficiency

(C) hydraulic efficiency

(D) turbine efficiency

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 71 Question Id : 26723610291 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Crippling load for a column having one end fixed and another end hinged is expressed

as:

(A)
$$P = \frac{2\Pi^2 EI}{l^2}$$

(B)
$$P = \frac{\Pi^2 EI}{l^2}$$

(C)
$$P = \frac{\Pi^2 EI}{4l^2}$$

(D)
$$P = \frac{4\Pi^2 EI}{l^2}$$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 72 Question Id : 26723610292 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Slenderness ratio of the column is expressed as:

- (A) effective length/maximum radius of gyration
- (B) effective length/least radius of gyration
- (C) least radius of gyration/ effective length
- (D) maximum radius of gyration/ effective length

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 73 Question Id : 26723610293 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Hoop stress in a thin cylinder is expressed as:

- (A) $pd/(8t)$
- (B) $pd/(4t)$
- (C) $pd/(2t)$
- (D) pd/t

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C

4. ✖ D

Question Number : 74 Question Id : 26723610294 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Strain energy stored by the spring is given by the expression as:

(A) $32 \frac{W^2 R^3 n}{Cd^4}$

(B) $16 \frac{W^2 R^3 n}{Cd^4}$

(C) $64 \frac{WR^3 n}{Cd^4}$

(D) $16 \frac{WR^3 n}{Cd^4}$

Options :

1. ✔ A

2. ✖ B

3. ✖ C

4. ✖ D

Question Number : 75 Question Id : 26723610295 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Poisson's ratio is given by:

$$(A) = \frac{3K - 2C}{6K + 2C}$$

$$(B) = \frac{6K - 2C}{6K + 2C}$$

$$(C) = \frac{3K - 2C}{3K + 2C}$$

$$(D) = \frac{K - C}{6K + 2C}$$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 76 Question Id : 26723610296 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Among the conventional machining process, maximum specific energy is consumed in:

(A) turning

(B) drilling

(C) planing

(D) grinding

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 77 Question Id : 26723610297 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a single point turning operation with a cemented carbide and steel combination having a Taylor exponent of 0.25, if the cutting speed is halved, then the tool life will become:

(A) half

(B) two times

(C) eight times

(D) sixteen times

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 78 Question Id : 26723610298 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

According to the Merchant's theory, as the rake angle decreases and the friction at the tool chip interface increases:

- (A) the shear angle increases and the chip becomes thinner
- (B) the shear angle decreases and the chip becomes thicker
- (C) the shear angle decreases and the chip becomes thinner
- (D) the shear angle increases and the chip becomes thicker

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 79 Question Id : 26723610299 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In gas welding the combustion takes place by mixing oxygen with:

- (A) H_2
- (B) CO_2
- (C) CO
- (D) C_2H_2

Options :

- 1. ✓ A
- 2. ✗ B

3. ✘ C

4. ✘ D

Question Number : 80 Question Id : 26723610300 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Hot chamber die casting is suitable for:

- (A) high melting point alloys
- (B) low melting point alloys
- (C) both low and high melting point alloys
- (D) heavy ferrous metal only

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 81 Question Id : 26723610301 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In cold working:

- (A) strength, hardness and ductility increases
- (B) strength and hardness increases, but ductility decreases
- (C) strength, hardness and ductility decreases
- (D) strength and hardness decreases, but ductility increases

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 82 Question Id : 26723610302 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Match List I and List II and select the correct option:

List I (Heat treatment)		List II (Effects)	
A	Annealing	1	Refines grain structure
B	Nitriding	2	Improves the hardness of the whole mass
C	Martempering	3	Increases surface hardness
D	Normalizing	4	Improves ductility

(A) A-4, B-3, C-2, D-1

(B) A-2, B-3, C-4, D-1

(C) A-4, B-2, C-1, D-3

(D) A-2, B-1, C-3, D-4

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 83 Question Id : 26723610303 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Mechanical governor contain leaf springs:

- (A) Porter governor
- (B) Hartnell governor
- (C) Pickering governor
- (D) Hartung governor

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 84 Question Id : 26723610304 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Swaying couple in two cylinder, 90° crank angle, inline locomotive engine will be maximum or minimum at:

- (A) 180°
- (B) 225°
- (C) 315°
- (D) 90°

Options :

- 1. ✓ A
- 2. ✗ B

3. ✖ C

4. ✖ D

Question Number : 85 Question Id : 26723610305 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The phosphorus in phosphor bronze is

(A) below 1%

(B) between 1% to 11%

(C) between 11% to 50%

(D) always above 50%

Options :

1. ✔ A

2. ✖ B

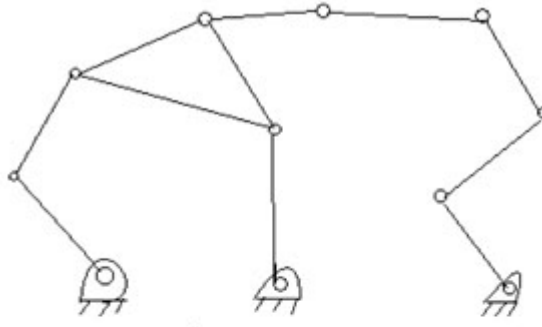
3. ✖ C

4. ✖ D

Question Number : 86 Question Id : 26723610306 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The degree of freedom for the following configuration is:



(A) 4

(B) 5

(C) 6

(D) 2

Options :

1. ✓ A

2. ✗ B

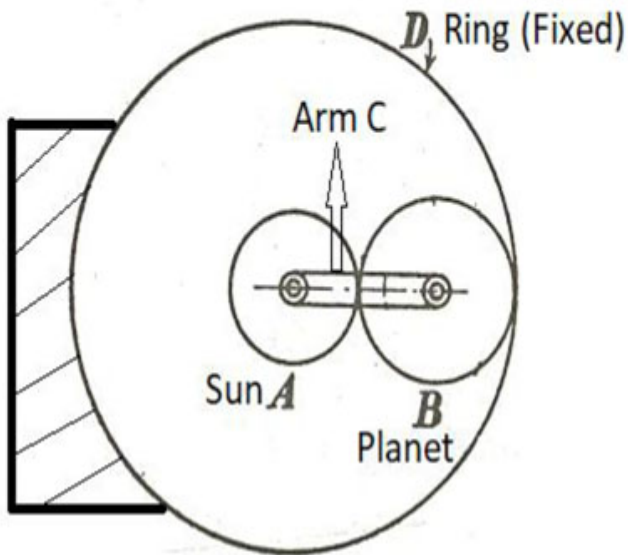
3. ✗ C

4. ✗ D

Question Number : 87 Question Id : 26723610307 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The sun gear A has 20 teeth and planet gear B has 30 teeth as shown in figure below. A has driven clockwise at 100 rpm. The ring gear D is hold stationary; the arm C rotates at:



- (A) 10
- (B) 20
- (C) 33.33 rpm
- (D) 66.66 rpm

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 88 Question Id : 26723610308 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A simple spring mass system has a natural frequency of ω . If the spring stiffness is halved and the mass is doubled, then the natural frequency will become:

(A) $\omega/2$

(B) 2ω

(C) 4ω

(D) 8ω

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 89 Question Id : 26723610309 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

If the damping factor in a vibrating system is unity, then the system will:

(A) have no vibration

(B) be over damped

(C) be under damped

(D) be critically damped

Options :

1. ✓ A

2. ✗ B

3. ✘ C

4. ✘ D

Question Number : 90 Question Id : 26723610310 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Flywheel absorbs energy during those periods of crank rotation when:

(A) the twisting moment is greater than the resisting moment

(B) the twisting moment is equal than the resisting moment

(C) the twisting moment is less than the resisting moment

(D) the load on the engine falls

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 91 Question Id : 26723610311 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Cast steel crankshaft surface is hardened by:

- (A) nitriding
- (B) normalizing
- (C) carburizing
- (D) induction hardening

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 92 Question Id : 26723610312 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

For spring controlled governor to be stable, the controlling force (F) is related to the radius of rotation of mass (r) by the equation:

- (A) $F=ar-b$
- (B) $F=ar+b$
- (C) $F=ar$
- (D) $F=(a/r)-b$

Options :

- 1. ✓ A
- 2. ✗ B

3. ✘ C

4. ✘ D

Question Number : 93 Question Id : 26723610313 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

For a small scale industry, the fixed cost per month is Rs. 5,000/-. The variable cost per product is Rs. 20/- and sale price is Rs. 30/-. The break-even production per month will be:

(A) 300

(B) 460

(C) 500

(D) 10000

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 94 Question Id : 26723610314 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Which one of the following is a quantitative technique of demand forecasting?

(A) correlation and regression analysis

(B) moving average method

(C) Delphi technique

(D) exponential smoothing

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 95 Question Id : 26723610315 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A stopwatch time study on an operator with a performance rating of 120 yielded a time of 2 min. If the allowances of 10% of the available time are to be given, the standard time of the operation is:

(A) 2 min

(B) 2.4 min

(C) 2.64 min

(D) 2.67 min

Options :

1. ✓ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 96 Question Id : 26723610316 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Match List I and List II and select the correct answer using the codes below:

List I (Methods)		List II (Problems)	
A	Moving average	1	Assembly
B	Line balancing	2	Purchase
C	Economic batch size	3	Forecasting
D	Johnson algorithm	4	Sequencing

(A) A-1, B-3, C-2, D-4

(B) A-1, B-3, C-4, D-2

(C) A-3, B-1, C-4, D-2

(D) A-3, B-1, C-2, D-4

Options :

1. ✔ A

2. ✘ B

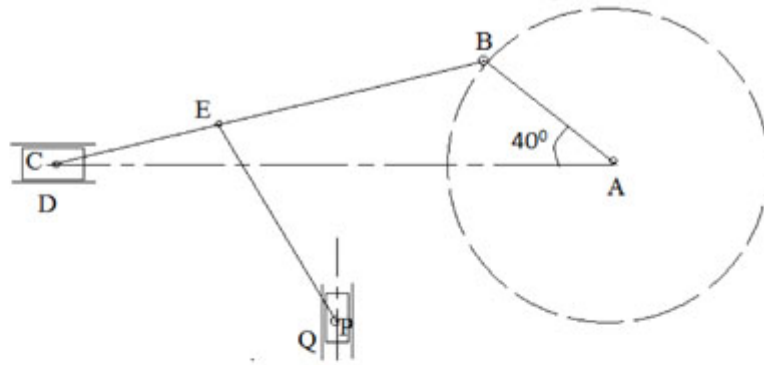
3. ✘ C

4. ✘ D

Question Number : 97 Question Id : 26723610317 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The number of instantaneous centers for the following mechanism are:



(A) 4

(B) 6

(C) 15

(D) 24

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 98 Question Id : 26723610318 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A flywheel of mass 10 kg has radius of gyration 20 cm rotating with 50 radian/second about its axis which has precessional motion of 0.3 radian/second. The magnitude of gyroscopic couple will be:

(A) 0.3 Nm

(B) 0.6 Nm

(C) 30 Nm

(D) 300 Nm

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 99 Question Id : 26723610319 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In two cylinder 90° crank angle inline uncoupled locomotive engine has load on each driving wheel is 250kN and balancing mass 5kg at radius 20cm. The maximum speed of wheel to avoid lift from the track will be:

(A) 2.5 rad/sec

(B) 50 rad/sec

(C) 250 rad/sec

(D) 500 rad/sec

Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 100 Question Id : 26723610320 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In hartnell governor, stiffness of spring placed on vertical sleeve is

(A)
$$p = \left(\frac{a}{b}\right)^2 \times \left(\frac{F_1 - F_2}{r_1 - r_2}\right)$$

(B)
$$p = 2 \times \left(\frac{a}{b}\right)^2 \times \left(\frac{F_1 - F_2}{r_1 - r_2}\right)$$

(C)
$$p = \left(\frac{a}{b}\right)^2 \times \left(\frac{F_1 + F_2}{r_1 + r_2}\right)$$

(D)
$$p = 2 \times \left(\frac{a}{b}\right)^2 \times \left(\frac{F_1 + F_2}{r_1 + r_2}\right)$$

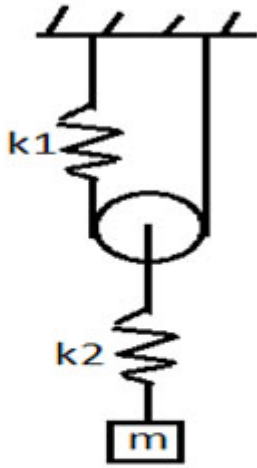
Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 101 Question Id : 26723610321 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The natural frequency of the given system below will be:



(A) $\frac{1}{2\pi} \sqrt{\left(\frac{2k_1k_2}{(2k_1 + k_2)m}\right)}$

(B) $\frac{1}{2\pi} \sqrt{\left(\frac{2k_1k_2}{(k_1 + 2k_2)m}\right)}$

(C) $\frac{1}{2\pi} \sqrt{\left(\frac{4k_1k_2}{(k_1 + 4k_2)m}\right)}$

(D) $\frac{1}{2\pi} \sqrt{\left(\frac{4k_1k_2}{(4k_1 + k_2)m}\right)}$

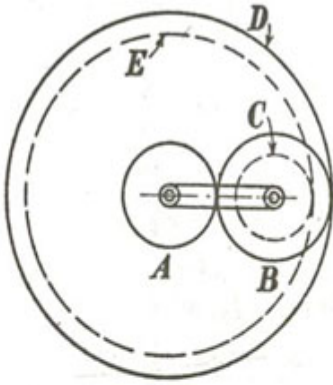
Options :

1. ✓ A
2. ✗ B
3. ✗ C
4. ✗ D

Question Number : 102 Question Id : 26723610322 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a gear train teeth on A, E and D has 30, 50 and 55 respectively as shown in fig. below, and module for B & C is same, then the teeth on gears B and C will be:



- (A) 40 and 30
- (B) 20 and 15
- (C) 30 and 20
- (D) none of the above

Options :

- 1. ✓ A
- 2. ✗ B
- 3. ✗ C
- 4. ✗ D

Question Number : 103 Question Id : 26723610323 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a thrust bearing the internal and external diameter of a collar are 40 cm and 20 cm respectively. If the load applied is 40 kN and coefficient of friction is 0.8, then the frictional torque will be (according to uniform rate of wear theory):

(A) 640 kNm

(B) 1920 kNm

(C) 32 kNm

(D) 96 kNm

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 104 Question Id : 26723610324 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A material has Young's Modulus $1.25 \times 10^5 \text{ N/mm}^2$ and Poisson's ratio of 0.25. The modulus of rigidity and bulk modulus will be:

(A) $5 \times 10^4 \text{ N/mm}^2$ and $8.3 \times 10^4 \text{ N/mm}^2$

(B) $5 \times 10^5 \text{ N/mm}^2$ and $8.3 \times 10^5 \text{ N/mm}^2$

(C) $15 \times 10^4 \text{ N/mm}^2$ and $8.3 \times 10^4 \text{ N/mm}^2$

(D) $15 \times 10^5 \text{ N/mm}^2$ and $8.3 \times 10^5 \text{ N/mm}^2$

Options :

1. ✓ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 105 Question Id : 26723610325 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A solid shaft of 200 mm diameter has the same cross-sectional area as that of hollow shaft of the same material with inside diameter of 150 mm. The ratio of the power transmitted by the two shafts at the same speed will

(A) 1:1

(B) 1:2

(C) 1:5

(D) 1:7

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 106 Question Id : 26723610326 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A close coil helical spring of 10 mm diameter has 10 complete turns with mean diameter of coil as 10 cm which is subjected to an axial load of 200 N. If the modulus of rigidity of material is $8 \times 10^4 \text{ N/mm}^2$, the deflection will be:

(A) $2.55 \times 10^4 \text{ mm}$

(B) 10 mm

(C) 20 mm

(D) 40 mm

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 107 Question Id : 26723610327 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The ratio of crippling load for a column of length l with both ends fixed to the crippling load of the same column with one end fixed and the other end free will be

(A) 2

(B) 4

(C) 8

(D) 16

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 108 Question Id : 26723610328 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A simply supported beam is overhanging equally on both sides and carries a uniformly distributed load. The length between the supports is more than the sum of overhanging lengths. The number of points of contra-flexure will be:

(A) 1

(B) 2

(C) 3

(D) zero

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 109 Question Id : 26723610329 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A beam of triangular cross-section is subjected to a shear force of 50 kN. The base width of the section is 250 mm and height 200 mm. The beam is placed with its base horizontal. The maximum shear stress will be in N/mm^2 :

(A) 3

(B) 2.67

(C) 2

(D) 1

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 110 Question Id : 26723610330 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

An effort of 100 N is applied on a simple machine to lift a load of 800 N. The distance moved by the effort is 100 cm. The load is raised to a distance of 10 cm. The percentage efficiency of the machine will be:

(A) 8

(B) 10

(C) 90

(D) 80

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 111 Question Id : 26723610331 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

A ball M of mass 1 kg moving with velocity 2 m/s, strikes to a ball P of mass 2 kg at rest. The ball M after striking comes to rest. The coefficient of restitution will be:

(A) 0.8

(B) 0.75

(C) 0.5

(D) 0.25

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 112 Question Id : 26723610332 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The centre of gravity of semi-circle of radius R from its base will be at

(A) $4R/3\pi$

(B) $3R/4\pi$

(C) $4\pi/3 R$

(D) $3\pi/4R$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 113 Question Id : 26723610333 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

In a sample of moist air at standard atmospheric pressure of 101.325 kPa and temperature 26°C, the partial pressure of water vapor is 1.344 kPa. If the saturation pressure of water vapor is 3.36 kPa at 26°C, then what are the humidity ratio and relative humidity of moist air sample?

(A) 0.00826 and 1.31%

(B) 0.00836 and 40%

(C) 0.01344 and 1.31%

(D) 0.01344 and 40%

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 114 Question Id : 26723610334 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The atmosphere air at dry bulb temperature of 15°C enters a heating coil maintained at 40°C . The air leaves the heating coil at 25°C . The by-pass factor of the heating coil is

(A) 0.376

(B) 0.4

(C) 0.5

(D) 0.6

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 115 Question Id : 26723610335 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

According to the law of steering, the correct expression is:

(A) $\sin \varphi - \operatorname{cosec} \theta = w/l$

(B) $\cos \varphi - \sec \theta = w/l$

(C) $\cot \varphi - \tan \theta = w/l$

(D) $\cos \varphi - \sin \theta = w/l$

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 116 Question Id : 26723610336 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The Diagram Factor for steam engine is defined as

1. Area of actual indicator diagram/ Area of hypothetical indicator diagram
2. Mean height of actual diagram/ Mean height of hypothetical diagram
3. Actual mean effective pressure/ Hypothetical mean effective pressure

Which of the following is correct?

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3 only

Options :

1. ✓ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 117 Question Id : 26723610337 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The advantage of Double Beat Valve in steam engine are

1. Superheat steam may be used since there is an absence of sliding parts
2. The cylinder condensation is reduced since there is a separate valve for admission and exhaust
3. Low initial cost owing to completed casting

Which of following are correct

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3 only

Options :

1. ✔ A

2. ✘ B

3. ✘ C

4. ✘ D

Question Number : 118 Question Id : 26723610338 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The steam engine has theoretical mean effective pressure is 5 bar and actual mean effective pressure is 4.5. The diagram factor will be:

(A) 0.5

(B) 0.9

(C) 0.1

(D) 0.11

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 119 Question Id : 26723610339 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

Condensation can be prevented in steam engine by

1. Supply superheated steam
2. Providing steam jacket around cylinder wall
3. Decreasing speed

Which of following are most correct

(A) 1 and 2 only

(B) 1 and 3 only

(C) 2 and 3 only

(D) 1, 2 and 3 only

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D

Question Number : 120 Question Id : 26723610340 Is Question Mandatory : No

Correct Marks : 1 Wrong Marks : 0.25

The plastic deformation caused by:

(A) stored elastic energy

(B) dislocation motion

(C) low value of modulus

(D) complex elastic stress

Options :

1. ✓ A

2. ✗ B

3. ✗ C

4. ✗ D