

Code : 1GC43

R11

II B.Tech. II Semester Supplementary Examinations Dec. 2014

**Environmental Science**  
(Common to CIVIL, ME & CSE)

Time: 3 hours

Max Marks: 70

*Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)*

\* \* \* \* \*

1. a) Define Environment? What are the various components of environment? 7M  
b) What is the need for studying environmental issues? 7M
2. a) What are the major causes of Deforestation? Briefly explain the effects of deforestation on environment? 7M  
b) Write an account of the growing energy needs with special reference to India. 7M
3. a) Discuss the ill effects of the use of chemical fertilizers and pesticides in agriculture. 7M  
b) Discuss the impact of over exploitation of minerals on environment. 7M
4. a) What are the main sources of marine pollution? Discuss their effects and suggest methods of control. 7M  
b) Write a note on urban solid waste management practices. 7M
5. a) Write short note on grass land and aquatic eco system? 7M  
b) Write notes on ecological pyramids. 7M
6. a) What are the various threats leading to loss of biodiversity? 7M  
b) Discuss the various strategies of in-situ conservation of biodiversity. 7M
7. a) Discuss the methods and advantages of rain water harvesting. 7M  
b) Explain how global warming is affecting our planet. 7M
8. What do you mean by population explosion? What are its effects on environment and other human aspects? 14

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Code : 1GC42

ANNAMACHARYA INSTITUTE OF TECHNOLOGY & SCIENCES :: RAJAMPET  
(AUTONOMOUS)

II B.Tech. II Semester Supplementary Examinations December, 2014

**Probability & Statistics**  
(Common to Civil, ME & IT)

Time: 3 hours

Max Marks: 70

*Answer any FIVE of the following*  
*All questions carry equal marks (14 Marks each)*

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1. a) Calculate the mean and standard deviation for the following.

$x$	6	7	8	9	10	11	12
$f$	3	6	9	13	8	5	4

- b) Obtain the rank correlation coefficient for the following data

$X$ :	68	64	75	50	64	80	75	40	55	64
$Y$ :	62	58	68	45	81	60	68	48	50	70

2. a) From a city population, the probability of selecting
- 
- (I) a male (or) a smoker is
- $7/10$
- , (II) a male smoker is
- $2/5$
- and
- 
- (III) a male, if smoker is already selected is
- $2/3$
- .

Find the probability of selecting

(i). A non-smoker (ii). a male and (iii). a smoker, if a male is first selected.

- b) From a vessel containing 3 white & 5 black balls, 4 balls are transferred into an empty vessel. From this vessel a ball is drawn and is found to be white. What is the probability that out of four balls transferred 3 are white and 1 is black?

3. a) A random variable
- $X$
- has the following probability distribution.

$X$ :	0	1	2	3	4	5	6	7	8
$P(X)$ :	5	$3k$	$5k$	$7k$	$9k$	$11k$	$13k$	$15k$	$17k$

Find (i)  $k$  (ii)  $P(X \geq 3)$ (iii) What if the smallest value of  $x$  for which  $P(X \leq x) > 0.5$ .

- b) A random variable
- $X$
- is distributed at random between the values 0 and 1, so that its probability density function is
- $f(x) = kx^2(1-x^3)$
- , where
- $k$
- is a constant.

Find (i)  $k$  (ii) mean (iii) standard deviation.

4. a) In a binomial distribution consisting of 5 independent trials, probabilities are 1 and 2 success are 0.4096 and 0.2048 respectively. Find the parameter
- $p$
- of the distribution.
- 
- b) A manufacturer, who produces medicine bottles, finds that 0.1% of the bottles are defective. The bottles are packed in boxes containing 500 bottles. A drug manufacturer buys 100 boxes from the producer of bottles, using poisson distribution, find how many boxes will contain (i) no defective (ii) atleast two defectives.

5. a) The mean of certain normal population is equal to the standard error of the mean of the samples of 64 from that distribution. Find the probability that the mean of the sample size 36 will be negative.
- b) What is the effect on standard error, if a sample is taken from an infinite population of sample size is increased from 400 to 900.
6. a) A random sample of 100 teachers in a large metropolitan area revealed a mean weekly salary of Rs. 487/- with a S.D of Rs. 48/-. With what degree of confidence can we assert that the average weekly salary of all teachers in the metropolitan area is between Rs. 472 to Rs.502
- b) To estimate the average amount of time, visitors take to move from one building to another in an office complex, the mean of a random sample of size 'n' is used. Given  $\sigma = 1.40$  minutes, determine how large should be the sample size if it is ascertained with 99% confidence that the error  $E$  is atmost 0.25.
7. a) A sample of 400 male students is found to have a mean height of 171.38cm can it be reasonably regarded as a sample from a large population with mean height of 171.17cm and S.D 3.30cm
- b) Two random samples drawn from normal populations are:  
 I : 20 16 26 27 23 22 18 24 25 19 - -  
 II : 27 33 42 35 32 34 38 28 41 43 39 37
- Test whether the two populations have the same variance.
8. Four methods are under development for making discs of a super conduction material. Fifty discs are made by each method and they are checked for super conductivity when cooled with liquid.

	Method I	Mehod II	Mehod III	Mehod IV
Super conductors	31	42	22	25
Failures	19	8	28	25

Test the significant difference between the proportions of conductors at 0.05 level.

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**STRUCTURAL ANALYSIS I***( Civil Engineering )*

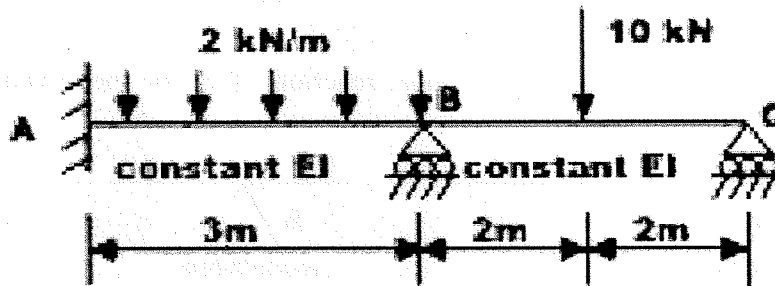
Time: 3 hours

Max Marks: 70

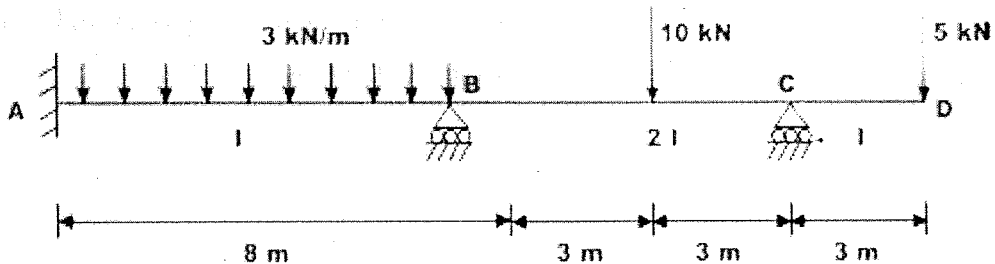
Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)

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1. A fixed beam of span 6m having uniform flexural rigidity is loaded with a point load of 40 kN at a distance of 4m from left end. Determine fixed end moments and draw bending moment and shear force diagram. 14M
2. A continuous prismatic beam ABC of constant moment of inertia is carrying a uniformly distributed load of 2 kN/m in addition to a concentrated load of 10 kN. Analyse the beam by Clapeyron's theorem of three moments. Draw bending moment diagram. Assume supports are unyielding. 14M



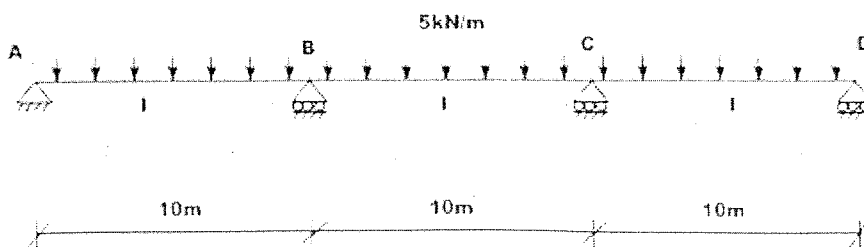
3. Draw bending moment diagram for the continuous beam ABCD loaded as shown in figure using slope deflection method. The relative moment of inertia of each span of the beam is shown in figure. Draw Bending moment diagram. 14M



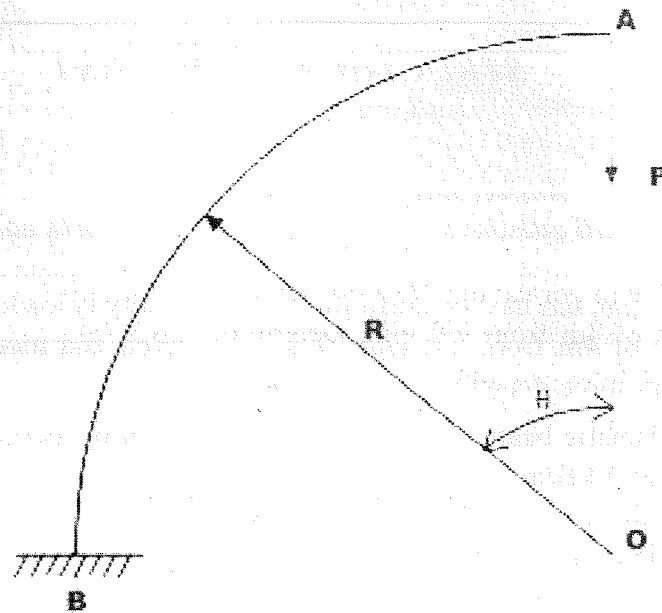
4. A continuous beam ABCD is carrying uniformly distributed load of 5kN/m over entire span as shown in figure. Use moment distribution method and compute reactions and draw shear force and bending moment diagram due to following support settlements. 14M

Support B, 0.005m vertically downwards

Support C, 0.001m vertically downwards

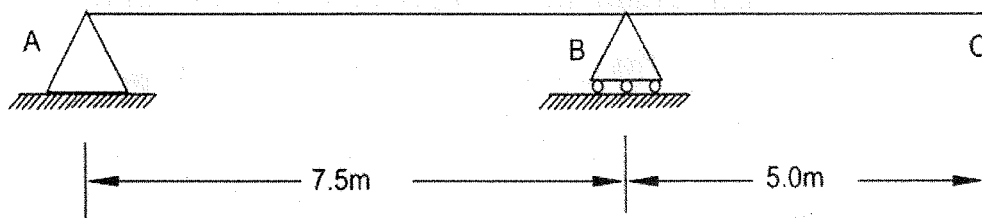
Assume  $E=200\text{GPa}$  and  $I = 1.35 \times 10^{-3} \text{ m}^4$ 

5. The curved beam shown in figure has uniform moment of inertia. Find vertical displacement of point A on the curved beam.



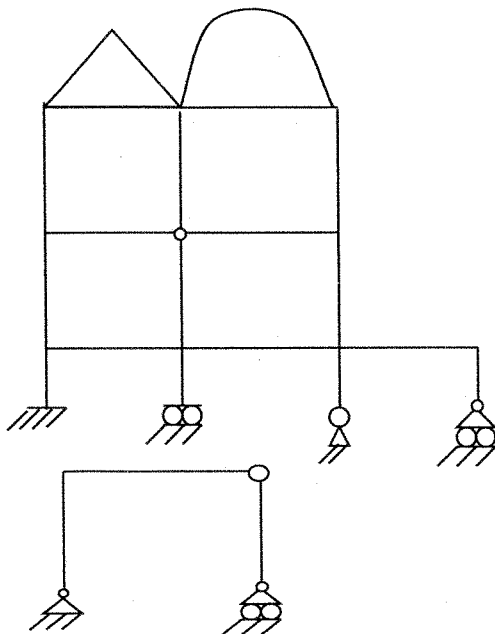
14M

6. Construct the influence line for support reaction at B for the given beam as shown in figure.



14M

7. A simply supported beam is loaded with two loads of 25 kN each spaced at 2.5m is travelling on the beam having span of 10m. Find the absolute maximum bending moment. 14M
8. Determine the static and kinematic Indeterminacy of the following frames.



7 x 2 = 14

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Code : 1G644

II B.Tech. II Semester Supplementary Examinations December, 2014

**BUILDING PLANNING AND DRAWING**  
(CIVIL ENGINEERING)

Time: 3 hours

Max Marks: 70

**PART-A**

(Answer any THREE questions)

14 x 3 = 42 Marks

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1. a) What is the significance of open space around a building? Give the criteria in this regard and specify the space requirements for a residential building. 14M
2. Write the requirements of the following elements of a residential building. 14M  
(i) Bed Room (ii) Dining Room (iii) Stairs (iv) Garage
3. Explain about planning of an office building. 14M
4. a) A project consists of six activities. The time estimates in days of the different activities are shown in fig 1. Find (a) Expected time of completion and critical path (b) Variance of the project.

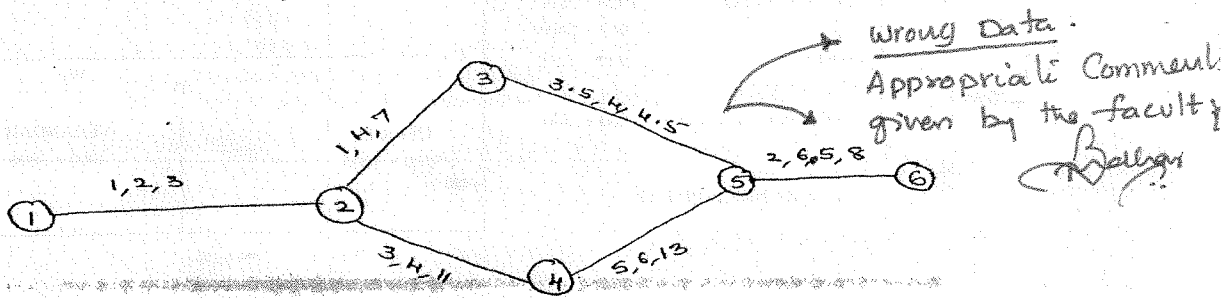


Figure 1

- b) Explain bar charts. What are the draw backs of the bar charts? 8M
5. a) What are the objectives of building bye-laws? 6M
- b) Explain the factors affecting the selection of a site for a residential building. 5M
- b) Explain the factors affecting the selection of a site for a residential building. 9M

**PART-B**

(Answer any one question on drawing sheet 1 x 28 = 28 marks)

6. a) Draw neatly to a suitable scale the conventional signs for the following: 10M  
(i) Brick (ii) Glass (iii) Wood (iv) Earth
- b) Sketch the front and side elevation of two paneled door with size of 1.0 m x 2.0 m. 18M

7. Figure 2 shows the line diagram of an office building. Draw to a suitable scale (a) plan (b) section along AA (c) front elevation, with the following specifications. Assume any other data required.

Foundation: Depth is 1000 mm, CC Bed (1:4:8) of 800 mm x 300 mm.

Footings: Two footings with an offset of 50 mm and 250 mm thick each.

Basement: 750 mm height, thickness of basement wall is 400 mm.

Super structure: Brick masonry in CM (1:6), 300 mm thick and 3600 mm height.

Roof: RCC Slab, 120 mm thick.

Flooring: CM (1:3), 20 mm thick over CC (1:5:10), 100 mm thick.

Sunshades: Projection from the face of the wall is 600 mm and thickness is 100 mm.

Parapet Wall: 100 mm thick and 600 mm height

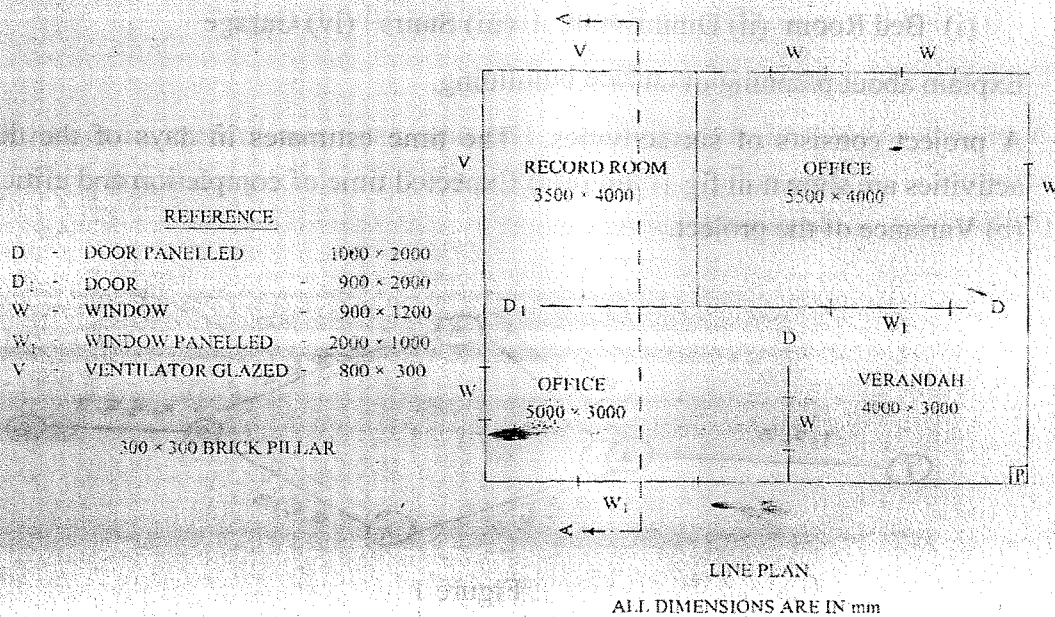


Figure 2

28M

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## II B.Tech. II Semester Supplementary Examinations December, 2014

**Hydraulics and Hydraulic Machinery**  
( Civil Engineering )

Time: 3 hours

Max Marks: 70

*Answer any FIVE of the following*  
*All questions carry equal marks (14 Marks each)*

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1. a) Illustrate the characteristics of boundary layer along a thin flat plate and explain laminar boundary layer, turbulent boundary layer and laminar sub-layer. 8M
- b) Calculate the total drag, shear drag and the pressure drag exerted on 1 m length of an infinite circular cylinder which has a diameter equal to 30 mm, air of density  $1.236 \text{ kg/m}^3$  flowing past the cylinder with velocity 3.6 m per minute. Take total drag coefficient equal to 1.4 and shear drag coefficient equal to 0.185. 6M
2. a) Define most economical channel section and get the relation between the depth of flow, width of the channel and hydraulic radius in the case of most economical rectangular channel section. 8M
- b) Explain the specific energy curve and show that the Froude number is '1' in the case of critical flow. 6M
3. Illustrate all the flow profiles that occur practically in the case of mild, critical, steep and adverse slope channels. 14M
4. a) With the help of neat diagram explain inlet and outlet velocity triangles when a jet striking an unsymmetrical moving vane tangentially at one of the tips. 8M
- b) A jet of water 75 mm diameter having a velocity of 20 m/s, strikes normally a flat smooth plate. Determine the thrust on the plate, if the plate is moving in the same direction as the jet with a velocity of 5 m/s. also find the work done per second on the plate and the efficiency of the jet. 6M
5. a) Give the complete classification of hydraulic turbines and explain the various efficiencies involved in the turbine design. 8M
- b) Explain the various working proportions in the case of Pelton wheel and Francis turbine. 6M
6. a) Explain specific speed and illustrate the performance curves of impulse and reaction turbine. 8M
- b) A Pelton wheel develops 5520 kW under a head of 240 m at an overall efficiency of 80% when revolving at a speed of 200 r.p.m.. Find the unit discharge, unit power and unit speed. Assume peripheral coefficient = 0.46. If the head on the same turbine falls during the summer season to 150 m, find the discharge, power and speed for this head. 6M
7. a) Explain the following in the case of Centrifugal pumps. 8M  
    i) Static head, ii) Manometric head, iii) NPSH, iv) Minimum starting speed.
- b) Find the power required to drive a centrifugal pump which delivers 40 litres of water per second to a height of 20 m through a 150 mm diameter and 100 m long pipeline. The overall efficiency of pump is 70% and Darcy's  $f = 0.06$  for pipeline. Assume inlet losses in suction pipe equal to 0.33 m. 6M
8. a) Explain the following: 8M  
    i) Storage and Pondage, ii) Load factor, iii) Utilization factor, iv) Capacity factor.
- b) A run-of-river hydel power plant with an installation capacity of 15000kW operates at 20% load factor when it serves as a peak load station. What should be the minimum discharge in the stream so that it may serve if the load station? The plant efficiency may be taken as 80% when working under a head of 15 m. also calculate the maximum load factor of the plant, when the discharge in the stream is  $30 \text{ m}^3/\text{s}$ . 6M

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II B.Tech. II Semester Supplementary Examinations December, 2014

**STRENGTH OF MATERIAL- II**

( Civil Engineering )

Time: 3 hours

Max Marks: 70

Answer any FIVE of the following  
All questions carry equal marks (14 Marks each)

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1. a) Derive an expression for circumferential stress for thin cylinder subjected to an internal pressure.  
b) A thin cylindrical shell 4m long and 800mm in internal diameter with 15mm thick plates is having longitudinal riveted joint with 70% efficiency. This shell is subjected to internal fluid pressure of  $200\text{N/mm}^2$ . Find the changes in length, diameter and volume of the shell. Take Poisson's ratio as 0.3 and  $E = 2 \times 10^5 \text{N/mm}^2$ .
2. a) Distinguish between thin and thick cylinders with suitable examples.  
b) A pipe of 400mm internal diameter and 100 thickness contains a fluid at a pressure of  $80\text{N/mm}^2$ . Find the maximum and minimum hoop stresses across the section. Also sketch radial and hoop stress distribution across the section.
3. a) Why hollow shafts are preferred to solid shafts to resist the torsion.  
b) A cylindrical shaft made of steel of yield strength 350MPa is subjected to static load consisting of bending moment of 15kN.m and a torsional moment of 40 kN.m. Determine the diameter of the shaft using (i) maximum principal stress theory, (ii) maximum shear stress theory (iii) maximum strain energy theory and (iv) maximum distortion energy theory. Take  $E = 200 \text{GPa}$ , Poisson's ratio = 0.25 and factor of safety = 2
4. A helical spring, in which the mean diameter of the coils is 10 times the wire diameter, is to be designed to absorb 300 J energy with an extension of 150 mm. The maximum shear stress is not to exceed  $140 \text{N/mm}^2$ . Determine the mean diameter of the spring, diameter of the wire which forms the spring and the number of turns. Assume the modulus of rigidity of the material of the spring as  $80 \times 10^3 \text{N/mm}^2$ .
5. a) Explain how Rankine's-Gordon formula is used to calculate the intensity of stress in short, intermediate and long columns.  
b) The external and internal diameter of a hollow cast iron column are 600 mm and 400 mm respectively. If the length of these columns is 4 m and both of its ends are fixed, determine the crippling load using Rankine's formula. Take the value of  $f_c = 550 \text{N/mm}^2$  and  $a = \frac{1}{1600}$  in Rankine's formula.
6. a) What do you understand by kern of a section? Show that the kern of a rectangular Section (b x d) is a rhombus.  
b) A square column 600mm side is fitted with a bracket to hold a pedestal bearing which supports a vertical load of 12kN at an eccentricity of 600mm. Calculate the maximum and minimum intensities of stresses induced in the section of column and sketch the stress variation.
7. a) A 60 mm x 50 mm x 6 mm unequal angle is placed with longer leg vertical, and is used as a beam. It is subjected to a bending moment of 15 kN. m acting in the vertical plane through the centroid of the section. Determine the maximum bending stress induced in the section.  
b) Differentiate between a straight beam and a curved beam with stress distribution in each of the beam.
8. A uniformly loaded circular beam is supported on equally placed columns. Derive expressions for maximum values of S.F, B.M. and torsional moment. Obtain salient values in the case of 4 supports.

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